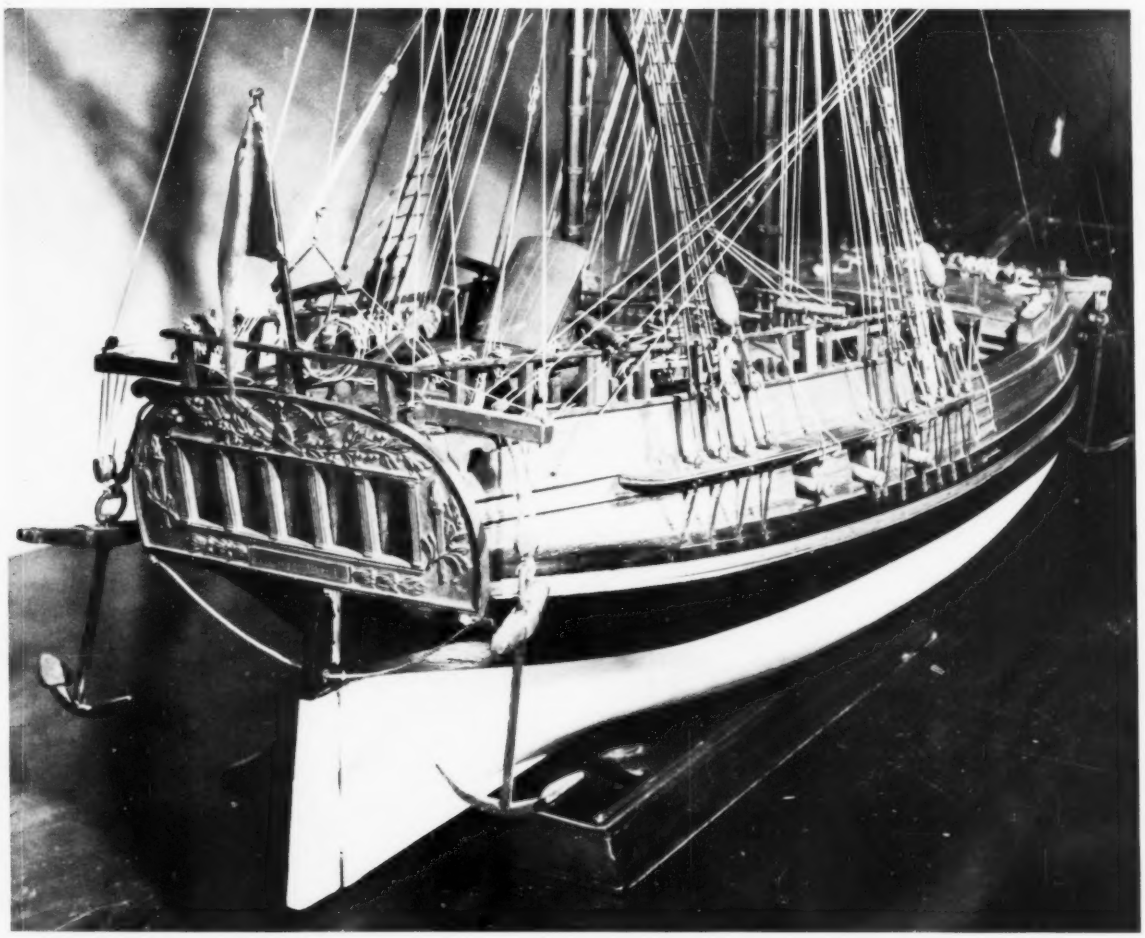
VOLUME 11, NO. 2

SUMMER, 1960

NAUTICAL RESEARCH JOURNAL

PUBLISHED BY THE NAUTICAL RESEARCH GUILD



COURTESY OF BERN C. RITCHIE & CO.

BOMB KETCH *MERCURE*

INTRODUCTION OF NEW MEMBERS

WILLIAM A. BAKER - 10 Rice Road, Hingham, Massachusetts: A naval architect and historian who is well known as the designer of the New MAYFLOWER that was built in England and sailed across the Atlantic to America. His most recent book, "The New Mayflower: Her Design and Construction", is an important contribution to nautical research and provides detailed plans for anyone wishing to model the Pilgrims' vessel.

COMDR. FRANCIS E. CLARK (USN Ret.) - 78 Gilbert Road, Weymouth Heights 89, Massachusetts: advises he is interested in sailing vessels in existence and in active service subsequent to World War I, steamboats to Cape Cod prior to the Civil War, and maritime history in general during the past 100 years; and is assembling data on trans-oceanic passages by square-riggers only since January, 1919. Mr. Clark is an author and historian.

Mrs. STUART (EDWINA) COFFING - 925 - 50th Street, Sacramento, California: writes: "My interest in whaling has developed over a number of years, but material available is very sketchy. All the whalers who wrote of their experiences failed to include California. Eventually, I should like to develop something on the influence they exerted on the establishing of California agriculture, as it was for the whalers that the first commercial vegetables were raised under Mexican rule before the Americans arrived... My greatest interest is in whaling ships that visited California ports prior to the Civil War... If there are others with similar interests, I would be pleased to correspond."

HUGH J. FITZGERALD - 2302 Indian Trail, Austin, Texas.

ROBERT HAMEL - 6 Howard Place, Jersey City 6, New Jersey: was introduced to the N.R.G. by Mrs. Frances Robotti, who advises he is a whaling enthusiast and collects many books on the subject.

ALFRED R. HENDERSON - 501 Seventh Avenue, Asbury Park, New Jersey: advises he is interested in square-riggers dating from 1850, marine biology, and oceanography. He is owner of the schooner ALBATROSS and maintainer of same. He collects books, prints, and paintings of sailing ships.

WESLEY W. KINNIER - 58 Catalpa Avenue, Hackensack, New Jersey: is a model builder interested in 18th century whaling and merchant vessels, and marine railroad vessels used from 1860 to date.

PHILIP E. KROUSE - 320 North Galena Avenue, Freeport, Illinois: indicates he is a model builder.

FRANCIS LOUCHOUARN - 49 rue Curie, Nantes (L.A.) France: advises that he is a modeler, research historian, and collector of published works on naval and sailing ships. He will correspond in English, if necessary.

DONALD M. TIFFANY - 43-35 - 171st Street, Flushing 58, New York: a professional builder of ship models to scale, and a restorer of fine old models.

HANS VAN ROO - Marialsan 107, Nijmegen, The Netherlands: writes that he is a model builder interested in Dutch, American, French, British, and Spanish sailing warships built between 1600 and 1850. He is a miniaturist and develops his own plans after careful research. Corresponds in English. Member of the Dutch Modelers Society (N.V.M.)

RICHARD D. WATSON - 9323 Wire Avenue, Silver Spring, Maryland: is interested in building ship models and is a member of the Washington Ship Model Society. He prefers

to model merchant vessels of the 18th and 19th centuries that combine power and sail. Mr. Watson was radio operator aboard the BEAR OF OAKLAND during the polar explorations of 1933-1935.

CHANGES OF ADDRESSES

CARL BOSTON - "The Landing", 1282 Lafayette Street, Cape May, New Jersey
ROBERT F. CHANDLER, JR. - 4475 Stonewall Road, N.W., Roanoke, Virginia
HARRY ECKSTEIN - 1 Vincent Road, Bronxville, New York
W. EARLE GEOGHEGAN - 605 North Charles, Baltimore 1, Maryland
JAMES G. HARRINGTON - 1319 Bayliss Drive, Alexandria, Virginia
CHARLES F. HRUSKA - 1281 Madison Avenue, New York 28, New York
CAPTAIN JOHN W. MORONEY - 1375 Installation Group, Vance Air Force Base,Oklahoma
ROBERT C. MACDONALD - 5454 Brantford Road, Memphis, Tennessee
RICHARD G. MCCLOSKEY - USIS Santiago, c/o Dept. of State, Washington 25, D.C.
HERBERT G. PURCELL - 55 East 4th Street, Morgan Hill, California
E. B. RING - Box 367, St. Augustine, Florida
GENE BRUCE REID - 19 Sylvan Ct., West Islip, New York
JOHN R. STEVENS - Curator, Maritime Museum of Canada, The Citadel, Halifax, N.S. Canada
ROLLIN M. WARNER, JR. - 940 Bay Street, Apt. #1, San Francisco, California
GARRY M. WHITE - 9403 Lexington, S.W., Tacoma, Washington

DECEASED

HARRY L. MAZER - of Baltimore, Maryland
PERLEY B. SANCOMB - of Novato, California

HELP WANTED:

During the past several quarters it has been possible to keep reasonably current with incoming correspondence relating to the business and financial side of the Nautical Research Guild. The paper work incidental to carrying on the work of the Secretary-Treasurer still remains formidable and will increase as the Guild grows. If there is any member who yearns to become a member of the working staff, his or her volunteering for the job will be most welcome. Access to a typewriter (with ability to use same) is one requirement, moderate command of the English language is another, and willingness to serve fellow members for no other compensation than their appreciation and best wishes concludes the list. If you are interested, write the Secretary directly.

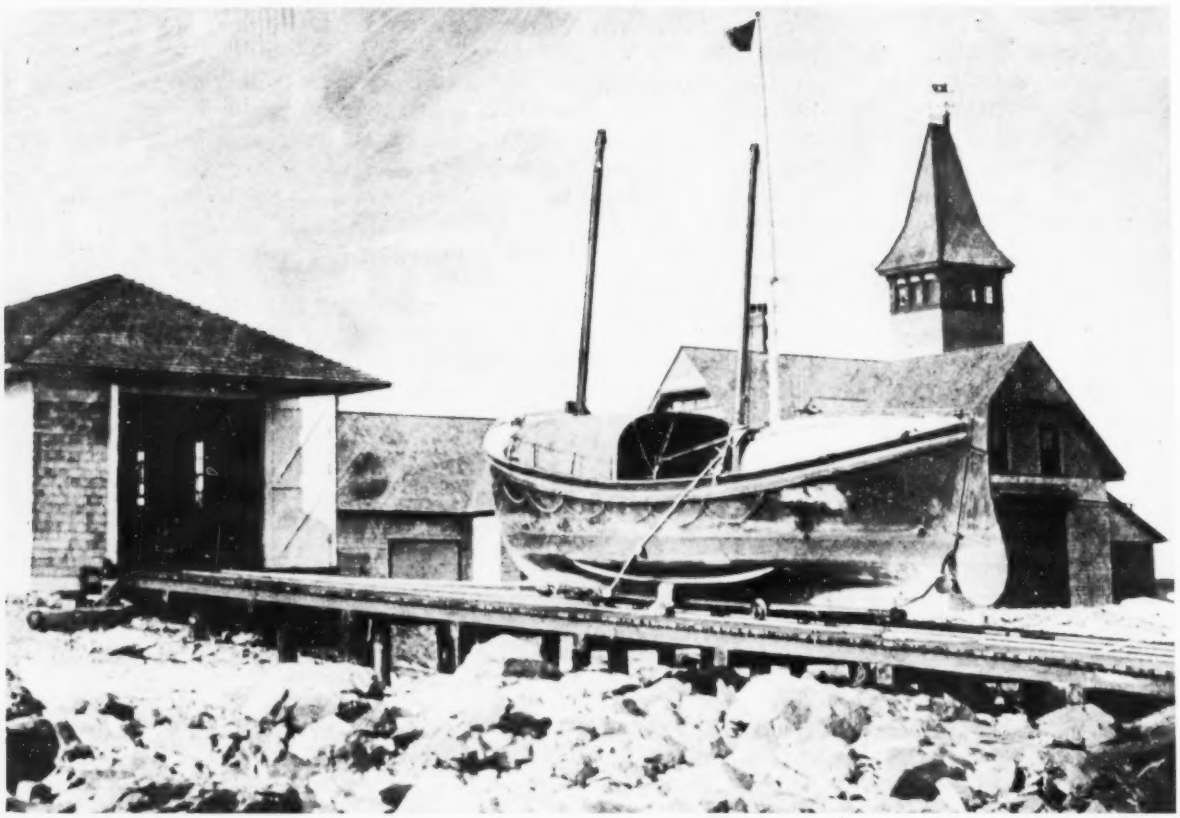
MOVING TO A NEW ADDRESS?

The post office will not forward the Journal to your new address unless you give them specific instructions to do so and provide the extra postage. When you do not do this, your copy is returned to the Editor. The time lost is more than you may suppose. The Spring number was printed in April, but copies were being return by the post office as late as July. Please notify the Secretary promptly of your new address.

TO AVOID DELAYS:

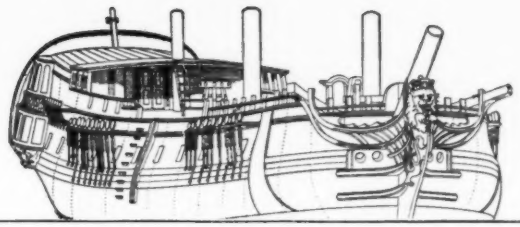
Enquiries about membership, payment of dues, and requests for back numbers of the Journal should be addressed to the Secretary: James W. Harbin, Jr.
4110 Beall Street
Landover Hills, Maryland

Articles and drawings, questions and answers, and other material for publication should be sent to the Editor: Roy Rogers
5001 - 14th Avenue
Brooklyn 19, New York



U.S. COAST GUARD PHOTO

36 FT. MOTOR LIFEBOAT, NO. 880, AT BRENTON POINT STATION, RHODE ISLAND, IN 1912



VOLUME 11, NO. 2 THE NAUTICAL RESEARCH JOURNAL SUMMER, 1960

In this era of mass production it seems that the number of subjects which are kept alive by individuals working alone is rapidly vanishing. Nowadays we wonder whether the independent inventor (in mind, anyway, if not financially) laboring in his workshop has been made a relic of the past by corporations with huge laboratories staffed by thousands of trained specialists. Something of this sort may be applied to the study of history, perhaps. We already have indications of this in the large staffs set up by various universities for editing and publishing the papers of prominent men. The Boswell papers, being edited at Yale, the Princeton edition of Jefferson's papers, and Franklin's works, another Yale production, are examples.

So far, though, marine history and archeology remain the province of the lone student. And while the professional ship model maker has been around for years, most model building is still done by men working by themselves. It does not appear that conditions in our favorite fields are going to change soon. In some ways I think this is a good thing, but, on the other hand, I wonder if there are not reasons for regret? "The Sea, the Ship, and the Sailor" - our familiar phrase - includes, in one way or another, nearly every subject under the sun. Who can say that we should be concerned with this and not with that? Everyone can pursue his own clues to the mysteries of the past, as far as his own interests will sustain him.

This state of affairs has some disadvantages, however. While the majority of us do not look on either maritime history or model making as expensive affairs, there sometimes comes a time when the lack of money may end research in certain directions. It might be a scientist without funds who is seeking artifacts in Egypt or a youngster who cannot afford to have photostats made of original plans in a museum. Another objection to people working completely alone is the foolish amount of duplication of effort that is taking place. A lady in Boston, a man in the Bronx, and still another man in London may all be chasing down the story of a South Sea whale ship. Each turns up the same facts, or perhaps one has a little more luck and stumbles upon a clue that unravels the whole mystery. These affairs do not always turn out so successfully. The same three, working independently of each other, may dig out such unrelated evidence that none of them is ever able to piece the history together. Each has done his best, but unless circumstances bring them together, they have merely amassed some haphazard information, useful to none.

Such senseless waste of time can be reduced greatly by more researchers and model builders publishing their evidence as they work, to say the obvious. Many well-known books are based on bits of information uncovered by several individuals over the years and preserved in the publications of various societies. Our knowledge of some vessels has grown to such certainty that we are liable to forget how many years were spent by others in compiling it. In addition to consulting original letters and other such primary sources, historians have to rely on the material gathered by others and published in the regional or local history journals. Since some of these extend back many years and are not accessible to all, more effort should be made to collect and organize this material.

Members living in large cities tend to forget that readers in small communities do not have access to the files of these publications. It is completely out of the question for these readers to pay researchers to go through such files and collate the data. Here, then, is a good example of the need for trained staffs that will make a thorough and systematic search of old documents and prepare them for publication.

The introduction of new members in each number of the Journal has enabled many with mutual interests to exchange information. That is a step in the right direction and, unfortunately, the only step since some live in distant cities and will probably never meet face to face. Conditions improve as soon as two or three people are actually brought together. Correspondence simply cannot substitute for personal meetings.

England has dozens of model clubs, all of them vigorous and constantly working to improve model making. In the United States there are several model groups which have managed to survive despite the general lack of interest among adults. In comparison with England, we have a poor record here. We have nothing at all approaching the annual "Model Engineer" exhibition. Up until a few years ago, there were local chapters of the Nautical Research Guild in several cities. These attracted a number of people and in some cases provided the only opportunity for them to meet and discuss mutual interests. There is no reason why these chapters cannot resume their activities. A formal program is not necessary. We are quite willing to do all we can through the Journal to bring interested members together.

While a ship model club naturally concentrates on construction techniques, this policy is somewhat shortsighted in the end. Some men with extensive knowledge of actual ships have attended one or two sessions of these clubs, but decided they were a waste of time because the modelers gave little indication they were concerned with historical accuracy. The clubs could increase their membership, with a resultant rise in the treasury, by including authorities who, while not model builders themselves, can pass on to the others the unique data they have accumulated.

-Roy Rogers, Editor

THE NAUTICAL RESEARCH JOURNAL is published by members of the NAUTICAL RESEARCH GUILD. Membership dues are $5.00 per annum and include all issues of the Journal published during the year, plus index of the current volume and a copy of the latest Membership Roster. New members receive the numbers which have been previously issued in the current year.

Dues are payable January First of each year and are in force until receipt of the written resignation of the member. Opinions and assertions in the Journal are the private ones of the writers. All rights are reserved and no material may be reproduced without the written permission of the Editor.

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THE SIZES OF STANDING RIGGING 1618-1640

BY WINTHROP PRATT, JR.

The proportions of all standing rigging appear to have been dependent upon the size of the mainstay. I say this because I think there must have been a formula wherein the relation of the size of a mast to the number of threads comprising the rigging was involved. However, the diameter (or circumference) of the mainstay does have a definite bearing on that of the other standing rigging.

The size of the mainstay is determined from the diameter of the mainmast at the partners (its greatest diameter), and the diameter of this mast is dependent upon its length, which in turn is determined by the beam of the ship. The ratio of length of mast to beam of ship had its variations. Anderson says the mast's length was "just less than 2 1/2 times the beam in large English ships, and might be as much as three times the beam in small ships." Miller, writing in 1655, says 2 1/2 times beam. It is well to note that the beam of English ships at this time was figured from outside to outside of the planking. For the model builder, a mainmast length (whole length) of 2 1/2 times the beam for large ships-of-the-line will be satisfactory. The diameter at this same period was generally one inch for each three feet of the whole length in large ships, and sometimes 3/4 inch for small vessels. There was some variation here, depending upon the type of tree used for the mast, but not enough to affect models of 1/4 inch scale or less to any appreciable degree.

It is much easier (and safer) to build a model of a ship whose dimensions are known, as there will be enough 'guesswork' anyway. But to return to our subject.

It is a well-established fact that the diameter of the mainstay was equal to 1/6 of the diameter of the mainmast, with very few exceptions (that is, when single mainstays were in vogue). Let us see how this fact, based on contemporary rules, stands up in actual practice. The SOVEREIGN OF THE SEAS had a mainmast 37 yards long and a mainstay with a 17 inch circumference, or about 5 2/3 inches diameter, which makes the stay diameter less than 1/6 mast diameter, if we use the rule of one inch diameter for each yard of length. The PRINCE ROYAL had a stay less than the above proportions also. Most of the other large ships of 1640 had a stay almost exactly 1/6 of the mast diameter. The GREYHOUND, ROEBUCK, and some of the WHELPES work out differently however. The first two being of small tonnage, we would expect a mast diameter of 3/4 inch to each yard of length, and their mast being 19 yards long would give a diameter of 14 1/4 inches. However, their mainstays were 7 inches circumference, which gives a diameter of about 2 1/3 inches or just about 1/6 mast diameter. The WHELPES, although having some variation in the length of their masts, work out to the same end, or nearly so.

On the whole, a mainstay diameter of 1/6 mast diameter is about right - perhaps a little under rather than more.

The Petworth House manuscript (which in 1928 became the property of the Science Museum), was published by the Society for Nautical Research in 1931, four years after Anderson's "Rigging of Ships in the Days of the Spritsail Topmast", and as Mr. Anderson does not mention it among his sources of information, one would suppose that he had not seen it prior to publication of his book. As the proportions of rigging in the Manuscript are at some variance with Anderson, and as it concerns English Royal ships prior to 1640, including the SOVEREIGN OF THE SEAS, a comparative study may be useful.

MAINSTAY, 1/6 Mainmast diameter. Mainstay collar about same diameter as stay for largest ships, and about 4/5 stay diameter on 2nd rates to as little as 2/3 on some 3rd rates. The 4th and 5th rates had it about 9/10 stay diameter, while in the 6th rates the collar is again equal to the stay diameter. Lanyards to the mainstay and its collar were just under half the collar diameter in most ships, but on some of the smaller ones the lanyard was a bit more than a third the collar diameter.

MAIN SHROUDS, a little less than half the mainstay on the largest ships to rather more than half for smaller ones. Lanyards were about half the shroud diameter, or just over half.

MAINMAST STANDING BACKSTAYS same size as shrouds, lanyards also same as shrouds' lanyards. Anderson, by the way, does not mention standing backstays for the lower masts, but the Petworth manuscript does. It is not unlikely, I think, that these were later called swifters. At any rate, they were the same size as the shrouds, and were probably the last one on each side, as the lists all call for two on the mainmast, and two for the foremast, with none on the mizzen. Those of the SOVEREIGN's mainmast totaled 28 fathoms, or 84 feet each, with 5 fathoms lanyards apiece. As a deadeye lanyard has six turns this would bring the upper and lower deadeyes about two diameters apart, which checks with Anderson.

The FORESTAY was, according to Anderson, 4/5 diameter of the mainstay, but the SOVEREIGN's was 15/17 and the PRINCE ROYAL's 13/16. The two next largest were 12/15, exactly 4/5 mainstay diameter, while in the smallest ships the ratio was 7/10, or less than 4/5. Lanyards were 1/2 diameter of forestay on the SOVEREIGN, but less on the other large ships, and almost 1/3 stay on the smaller vessels.

FORE SHROUDS a bit less than the main shrouds - for big ships, about 16/17 or so, to as little as 8/9 on some smaller ones. Anderson says 2/5 mainstay, which is about the same.

FOREMAST STANDING BACKSTAYS AND LANYARDS, same as fore shrouds.

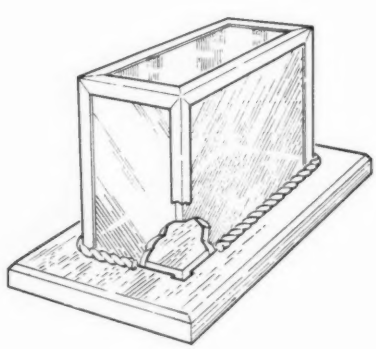
MIZZEN STAY is just over 1/3 mainstay for the SOVEREIGN (with lanyards 1/2 their stay), but less than 1/3 mainstay on others, with lanyards from 1/2 to 2/3 their stay. Anderson says stay is 2/5 mainstay.

MIZZEN SHROUDS about the same as mizzen stay on large ships (or a bit less), and generally same as stay on others. Lanyards about half shroud diameters, to as much as 2/3 on smaller craft, but pretty generally 1/2 shroud.

SMALL GLASS CASES

BY EDWARD F. SCHORTMAN

The construction of the conventional wood and glass case often poses a problem for the kitchen table modeler. The method described here has been used by me to make two cases, one of which has shown no sign of weakness since it was constructed over two years ago. The materials needed are glass (of course), small brass angles, and an adhesive developed by Armstrong Cork and Tile, called "910".



MAIN TOPMAST SHROUDS a bit more than 1/4 mainstay diameter for large ships and just under 1/3 mainstay on small ones. Lanyards generally 1/2 shrouds, occasionally a bit over half.

MAIN TOPMAST STAY a bit less than 1/2 mainstay for big ships to about 1/3 mainstay for some smaller ones. Anderson says the main topmast shrouds were 1/4 mainstay and same size as mizzen lower shrouds which does not agree with Petworth Ms. He also says the main topmast stay is 1/2 mainstay - a bit over the Petworth sizes.

MAIN TOPMAST STANDING BACKSTAYS same as main topmast shrouds. Anderson doubts that these were at all usual before 1640, but virtually all ships in this list have them.

FORE TOPMAST SHROUDS about 1/4 mainstay on larger ships, to 1/2 mainstay on others through 5th rates, but the 6th rates of 120 tons or less had them 1/4 mainstay or a bit over. (Anderson says 1/5 mainstay.) Lanyards generally 1/2 shrouds or a bit over.

FORE TOPMAST STAY a bit less than 1/3 mainstay on largest ships, and about 1/3 mainstay on large 2nd rates, with some 4th rates having a ratio of 3/10. Anderson says 2/5.

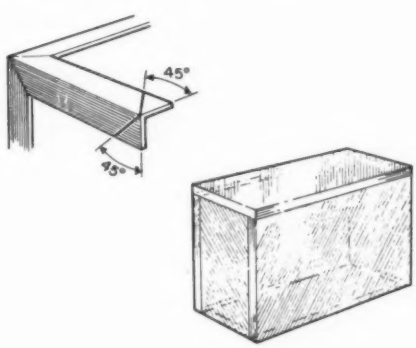
FORE TOPMAST STANDING BACKSTAYS a bit larger than the topmast shrouds on big ships, and same as shrouds on smaller ones. Lanyards generally 1/2 backstays.

MIZZEN TOPMAST RIGGING not mentioned in Petworth Ms., although all ships carried mizzen topmasts.

Clowes says that a manuscript copy of a "Survey of the Navy", made in 1618, is in the Public Record Office, and also states that the Petworth House manuscript of 1640 represents an intermediate development in rigging between that laid down for future use in 1618 and that in Deane's "Doctrine of Naval Architecture" of 1670. It is thus applicable to ships of the early and middle part of the 17th century. Most ships in the list were built between 1616 and 1639.

Continued on next page

The top glass panel should be large enough to cover the end and side panels when fitted together. The glass edges need not be polished since they will not show and do not affect the strength of the joints. The brass angles are mitered by any convenient method, leaving a small excess to allow for hand fitting. No angles are used around the bottom.



QUESTIONS AND ANSWERS

The purpose of this section is to provide a means of obtaining and exchanging information which is not generally accessible. Correspondents who send their answers directly to the inquirer are urged to send copies to the Journal, so that the information can be made available to others.

QUESTIONS:

(11-2-1) Steamer GREAT BRITAIN (1843): The GREAT BRITAIN was a famous iron screw steamer launched in England in 1843. She started life as a six-master and at various times was a five, four, and three-masted vessel. Most of her days were spent as a three-masted auxiliary on the England to Australia run. In 1886 she was condemned to hulk duty in the Falkland Islands. I am now reconstructing plans of her and especially desire the loan of photos, literature, and the like for any of the periods of her existence, and I will exchange my information with interested parties.

-Edward A. Mueller

(11-2-2) Phoenician ships: I am gathering background material for a novel which centers on a Phoenician ship of about 600 B.C. The characters in my book will be sailors who must live and work almost solely within the confines of their ship. I have to know how she was constructed, equipped, and accoutered in order to describe accurately their day-to-day life. Also, I have to know, as well as I am able, how she sailed, her abilities and faults, what she could do, and what kind of circumstances would get her in trouble. Any help will be highly appreciated.

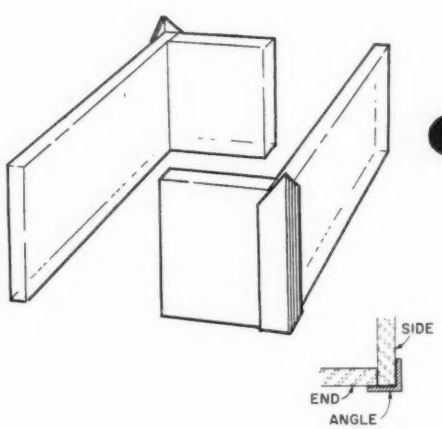
-Edward G. McNamar

(11-2-3) Running lights: I can find little on the subject of running lights, and most plans fail to show them. I am sure that something must have bridged the gap between the stern lanterns of the 18th century and the modern form of lights. Can anyone suggest where additional information car be found?

-W. E. Harper, Jr.

(11-2-4) Where can I find a copy of Barras de la Penne's "La Science des Galeres"

The 910 adhesive is best applied as a series of drops to one of the surfaces to be joined; make no attempt to spread it on as this will cause it to polymerize and become adherent. Setting time is approximately five seconds, and any motion during this period destroys the bonding strength. When miters match all around, the glass is glued to the inside of the angle. I have found it best to glue one end to one side, and then put these aside while gluing together the other two. These two units can be assembled and the top glass laid in place. The remaining angles are glued on afterwards. Additional strength may be gained by then soldering the miters. The adhesive has stood the heat of a 225 watt iron without weakening.



(Marseilles, 1697)? I know the plates are in "Souveniers de Marine", but where is the text to be found, if, of course, there ever was one?

-James Ferguson

(Note: The above query has raised one in my own mind: is Mr. Ferguson our most optimistic member? It is hard to believe that a reader is going to produce this volume when it is realized that it cannot be found in the catalog of the Library of Congress, the Bibliotheque Nationale, the British Museum, or the National Union Catalog. -Ed.)

(11-2-5) French museums: Both Marseilles and Toulon were galley ports. One or both of them has a museum devoted to marine relics, especially those pertaining to galleys. Can someone supply the addresses of these museums?

-James Ferguson

(11-2-6) Cap shores: In "The Anatomy of Nelson's Ships" there is described as part of the full-size restoration of the VICTORY a fitting which I have been unable to find described in print elsewhere. This is called in that book a "cap pillar" and is a support for the forward end of the lower cap. It resembles the normal turned baluster post, except for length, and extends from the underside of the cap to the trestle trees where it is supported. It is easy to understand that the weight of the yard, hanging from the cap, would tend to break the short section of the lower mast which fitted inside the cap or to cause the cap to be on a slant instead of remaining horizontal, and this pillar (or cap shore, as it is sometimes called) would take most of this stress.

So far so good; the real point of the question is this:- were such fittings usual for the three-deckers only? If so, when did they come in, and did they then exist for the remaining period of wooden masts in sail? It would be very helpful if some definite information could be obtained in this connection. The idea of a pillar or stanchion makes such good sense that one would expect it to be fitted to (at least) all of the heavy frigates and ships of the line, for there was little difference in the weight of the yards and sails - in fact, some of the early heavy frigates cut down from liners - the razees - carried the same masts and yards which they had carried when they were a deck higher. (Perhaps there were three-deckers cut down to frigates, but I have never discovered any such references!) Acting on the hunch that such may have been the case, a good library on the subject has been combed without finding as much as a reference to such a fitting.

A possible hypothesis is that the support was fitted only to ships which needed some such help, as for instance during a refit or major repair, for the support (pillar,

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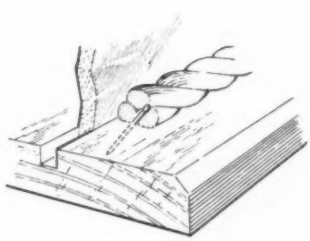
A rabbet is cut in the base board to receive the case, making allowances for the corner angles. I covered the small cracks between the glass and the wood with 1/4 inch tarred rope. The rope ends were seized with black thread, and these were placed so that they would be at the back. The rope is nailed down at short intervals with small finishing nails. This makes for a finished case, acts as a dust seal, and adds a definite nautical flavor that is lacking in the more conventional cases.



stanchion, post, or shore) does not appear in any of the illustrations of Admiralty models which I have seen published.

-Cary S. Tucker

(11-2-7) Boat booms: One of the most common fittings on the sailing ship was the boom used to extend the foot of a fore lower studdingsail. The forward end was attached to a socket in the fore chains, and the after end rested, when not in use, in a bracket near the main chains. When the ship was at anchor the boom was rigged out so that several small boats could tie up. In this position the boom was usually high above the men in the boats and they had to resort to rope ladders to reach it. Why was no provision made for shipping this boom at a lower position while the ship was at anchor?

-Ernest M. Pittaro

(11-2-8) Schooners TE VEGA and ANGELITA HUSSAR: Any kind of information concerning these vessels will be appreciated. The TE VEGA appeared in a Cinerama movie.

-Allan H. Mondeaux

ANSWERS:

(10-4-3) The GENERAL ARMSTRONG: In the Adam and Noah Brown memorial to the government it is stated that they built this privateer as well as the NEUFCHATEL. I should think the ARMSTRONG was very similar to the NEUFCHATEL in appearance and rig, and probably near her in size. Certainly she was larger than the ARGUS and was a sharp model, like the NEUFCHATEL. The Shephard dimensions are much too small, for a 149 ton vessel would be a mere pilot boat. The New York Custom House Registers may answer this question, and if the builder's certificate could be found, there may be a useful description. I don't think the 42 pdr. was pivoted, for the large schooner privateers were built with high bulwarks. The Long Tom was probably on a carriage and was a shifting gun. It should be noted that, in 1812-15, brig and brigantine were hard to differentiate for brig was used as an abbreviation of brigantine. A great many of the large privateers were variations of the fore-and-main topsail schooner of which the NEUFCHATEL was an example.

-Howard I. Chapelle

The "42 pdr." Long Tom was a French 36 pdr. of the establishment of 1786..... Coggeshall said that she had six 9's and the "42 pdr." her last voyage and had used twelve 9's and one 12 pdr. previously. She probably had at least 14 ports, broadside, as the 12 pdr. (and later the 42) were most likely on ordinary broadside carriages, not actually pivot mounts... The odd thing, to me, about this gun was that a 1945 parallel to it would have found a destroyer escort carrying 16 inch battleship armament and perhaps more, since the English navy gave up the practice of carrying 42's on the lower battery in about 1790 as they were too heavy in comparison with the 32 pdr. (around the equivalent of a French 27 or 28 pdr.) The French "pound" was greater than the English one, but the real trouble was that when the size of the French guns' bores was set by decree the shot used were of a specific gravity of 17% less than normal. At least so says Charles Dupin in his "Works and Travels" of ca. 1819.

-Cary S. Tucker

(10-4-5) Schooners HESPER, LUTHER LITTLE, and MARY F. BARRETT: I have photo negatives of the HESPER and the LITTLE, taken three or four years ago, and may also have one showing the BARRETT. I can make up prints for anyone interested. I have quite a few negatives and glass plates of whalers, fisherman, and coasting schooners, and a number

of detail shots of Gloucestermen taken in the 1920's.

-Charles F. Sayle

(11-1-2) Collins Line steamer: We have a half-model and lines of the ADRIATIC here at the Smithsonian. None of the others are available.

-Howard I. Chapelle

(11-1-4) Fighting bolt: As the reader may have noticed, all carronades used on warships seem to have been mounted on a "bed" which was fastened to a "slide" (or "skids") by a bolt which was free to move in a slot in the slide. The front of the slide was pivoted on a fixed vertical bolt which went down through the waterways, through the center of the port, or even down into a wale on the outside of the ship. The socket for the pivot bolt, however, in the case of the two French-built English frigates which our Navy fought in the War of 1812, appears to have been slightly inside the ports and to have been secured by the "fighting bolts" which went horizontally through the ships' sides. At least that would be the sense conveyed to me by the remark that "the fighting bolts of the carronades had been driven back through the sides of the ship," which is the way I remember the remark as having been used.

-Cary S. Tucker

(11-1-5) Origin of the schooner in America: I seem to be in a position to answer my own request for pictorial evidence that the Dutch introduced the schooner to North America at New Amsterdam. By chance I picked up a copy of the English periodical "History Today", with an article on Peter Stuyvesant. This included a reproduction of the earliest known view of New Amsterdam, dated approximately 1626. And, sure enough, in the mid-foreground was a two-masted fore-and-aft-rigged vessel of the kind the Dutch used as yachts or for travelling on their canals - the kind of rig that looks like two lateen sails with the masts omitted and one end of the yard stuck into the deck. The picture, of course, is not an accurate representation of the colony as it then existed but rather as it was planned to be, and was made in Europe. Still it seems an inescapable inference that the sort of small fore-and-after illustrated would be exactly the type of vessel the Dutch would take along for exploring work in Long Island Sound and up the Hudson. This picture, taken with the occurrence of the word schooner in a pamphlet about New Amsterdam of 1649, which consists of a conversation taking place on board a canal boat in the Netherlands, makes the chain of evidence almost uncannily complete - at least as complete as one can ever hope for in an imperfect world.

-James Ferguson

I have not found any evidence of the schooner having been used at New Amsterdam. There is evidence of the rig in England before 1700, and I suppose it came to America from there.

-Howard I. Chapelle

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THE STANDARD 36FT. MOTOR LIFEBOAT OF THE U.S. LIFE SAVING SERVICE - 1907

BY WILLIAM D. WILKINSON

When the U. S. Life Saving Service was re-organized in 1871, acquisition of new, improved surfboats and lifeboats was given high priority. The Royal National Life-Boat Institution by this date had achieved considerable success in the development of self-righting, self-bailing pulling boats, and in 1872, the Life Saving Service purchased such a craft, about 30 ft. in length, from the British. This boat, still in existence and on exhibit at the Mariners Museum, Newport News, Virginia, was the forerunner of the Coast Guard's standard motor lifeboat as it is known today.

Ultimate development of the self-righting, self-bailing pulling lifeboat was reached in a standard model of 34 ft, and in one of these, during 1899, was installed a gasoline engine, making it the first motorized lifeboat in this country. Principally responsible for this installation was Lt. Charles H. McLellan, an officer in the Revenue Cutter Service, who had become interested in lifesaving equipment and techniques while assigned as an Inspector to the Life Saving Service and who later played an extensive role in the development of its small craft.

In 1900, the Secretary of the Treasury authorized the establishment of a commission to develop further the requirements of a successful motor lifeboat design. Lt. McLellan was a member of this group, which was headed by Professor C. H. Peabody of the Massachusetts Institute of Technology. Many experiments and tests were carried out with various power installations and boats, and in 1904-05, the commission had designed and built to its specifications a 34 ft. motor lifeboat. Actual service indicated further improvements, however, and in 1907, a 36 ft. lifeboat was designed by McLellan, who by now had retired from the Revenue Cutter Service and become superintendent in charge of construction of lifeboats, lifesaving apparatus, etc., for the Life Saving Service. With only relatively minor modifications, this was the standard self-righting, self-bailing motor lifeboat used by the Service until its merger in 1915 with the Revenue Cutter Service and the resultant formation of the Coast Guard.

As far as is known, all boats of this type up to 1915 were built by Electric Launch Company of Bayonne, New Jersey and Holmes Motor Company of West Mystic, Connecticut. Interestingly, the first one of these boats was purchased from Electric Launch by the Canadian Government for use in British Columbia at Benfield Creek, Vancouver Island. The first boat for the Life Saving Service was completed early in 1908 by Holmes and also served on the West Coast, at Waadah Island, just inside Cape Flattery, Washington. By June, 1915, there were 44 boats of this type in the Service: 19 on the Atlantic and Gulf Coast, 14 on the Great Lakes, and 11 on the Pacific.

Following are the principal dimensions of the 1907 36 ft. motor lifeboat:

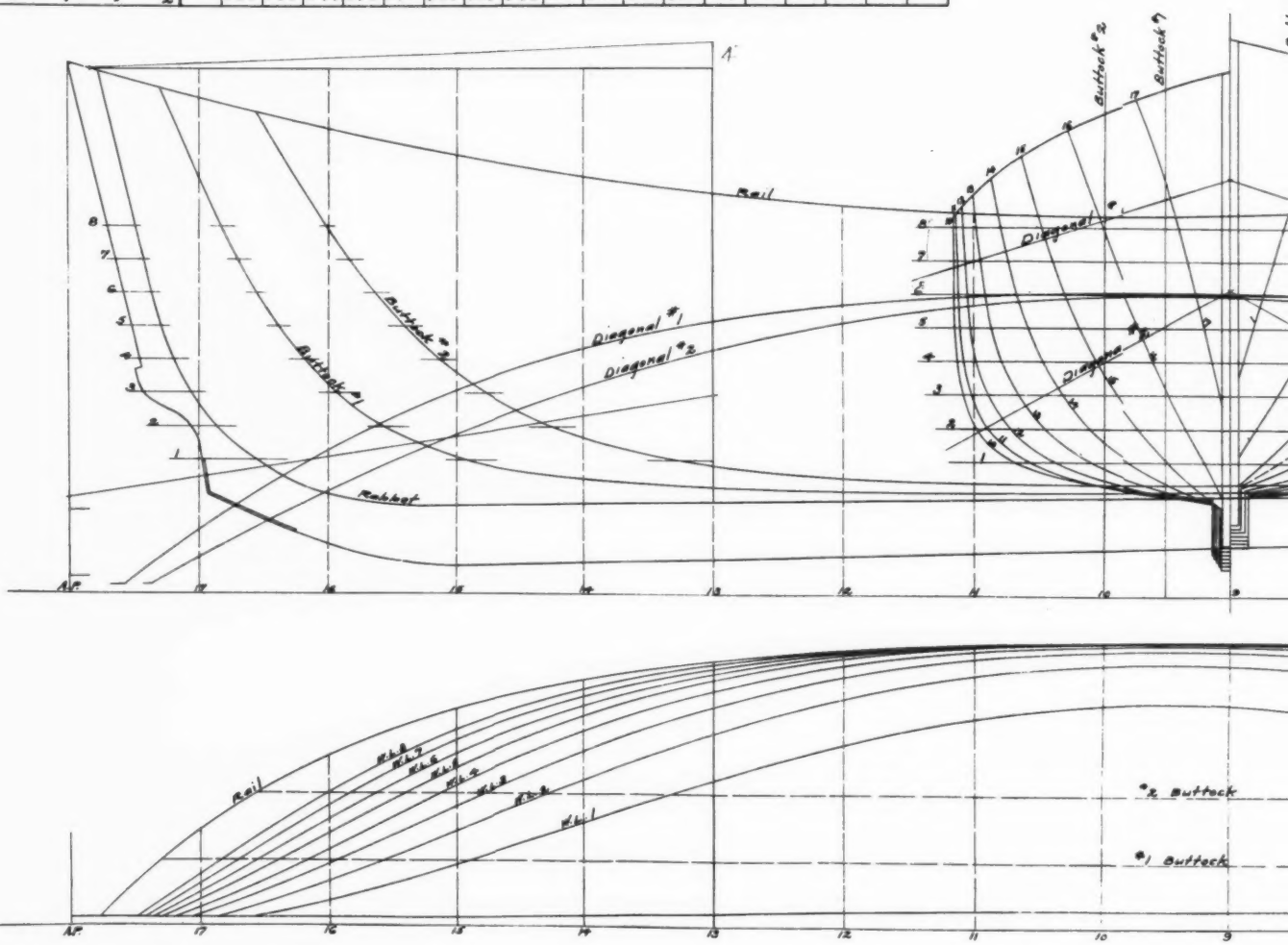
Extreme length outside of stem and sternpost	36'-0"
Extreme beam outside of planking	8'-7½"
Depth from skin to gunwale amidship	4'-2½"
Length of end box inside of stem rabbet	7'-4"
Length of end box inside of sternpost rabbet	9'-7"
Depth at rabbets of stem and sternpost	6'-7"
Sheer of deck between end boxes	0'-4½"
Distance between centers of thwarts	3'-4½"

continued on page 49

PLATE LINES

Note Dimensions are in feet – inches – eights.

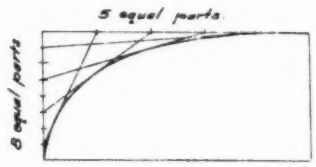
Stations	A.P.	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	F.P.
Heights – Rabbet		2-10-1	1-6-0	1-3-7	1-4-3	1-4-5	1-4-7	1-5-3	1-5-5	1-6-0	1-6-3	1-6-5	1-7-0	1-7-3	1-7-5	1-8-1	2-0-5	3-3-0	
" Buttock #1		6-2-4	3-1-4	2-0-5	1-8-5	1-7-2	1-6-5	1-6-4	1-6-5	1-6-7	1-7-2	1-7-5	1-8-3	1-8-4	1-11-7	2-5-3	3-5-6	6-1-2	
" " #2			5-5-2	3-3-5	2-3-7	1-10-7	1-9-0	1-8-1	1-7-7	1-8-1	1-8-6	1-9-5	1-11-0	2-1-7	2-10-2	3-8-0	5-0-0		
" Rail	7-11-4	7-5-1	6-11-5	6-6-6	6-3-0	5-11-7	5-9-6	5-8-4	5-8-1	5-8-4	5-9-5	5-11-4	6-2-1	6-5-3	6-8-1	7-1-5	7-6-3	7-11-4	8-5-0
Half breadth – Rail		1-5-3	2-6-6	3-3-2	3-8-5	4-0-0	4-2-0	4-3-1	4-3-5	4-3-6	4-3-5	4-3-0	4-1-7	3-10-0	3-8-5	3-3-5	2-7-6	1-7-0	
" " W.L. 8		0-3-3	2-0-2	2-11-4	3-7-0	3-11-4	4-1-6	4-3-1	4-3-4	4-3-6	4-3-4	4-2-6	4-0-7	3-9-6	3-4-7	2-13-3	1-10-7	0-3-7	
" " W.L. 7		0-7-5	1-3-7	2-0-5	2-5-4	2-10-5	3-1-4	3-3-0	3-3-4	3-3-6	3-3-3	3-2-5	3-0-2	2-8-0	2-3-0	2-7-1	1-8-3	0-8-0	
" " W.L. 6		0-6-1	1-1-3	1-7-2	2-3-7	2-7-6	2-11-1	3-2-7	3-3-4	3-3-6	3-3-2	3-1-6	2-11-4	2-7-0	2-0-7	2-4-5	1-6-0	0-6-1	
" " W.L. 5		0-4-5	1-0-7	1-4-5	2-2-0	2-6-6	2-10-5	3-1-3	3-2-5	3-3-3	3-3-5	3-2-7	3-1-1	2-8-7	2-5-1	2-10-4	2-1-6	1-3-2	0-9-2
" " W.L. 4		0-3-2	0-11-7	1-2-4	1-7-4	2-1-2	2-6-5	2-11-3	3-1-7	3-2-0	3-2-0	3-2-4	3-2-0	3-0-1	2-12-5	2-7-2	1-10-2	1-0-4	0-2-3
" " W.L. 3		0-2-0	0-10-3	1-0-6	1-5-5	1-9-6	2-0-2	2-3-2	2-4-4	2-4-1	2-4-1	2-3-7	2-1-1	1-10-1	1-8-5	2-1-4	1-10-3	1-5-6	0-8-5	
" " W.L. 2			0-8-2	1-0-2	1-2-4	1-5-6	1-8-2	1-9-7	1-10-4	1-11-0	1-11-5	1-9-7	1-8-4	1-6-1	1-3-1	1-6-4	1-3-4	1-0-4	0-4-5	
" " W.L. 1			0-4-5	0-11-2	1-0-7	1-2-0	1-3-6	1-3-1	1-3-2	1-2-3	1-2-0	1-1-6	1-0-1	0-11-2	0-10-5	1-0-3	0-5-7		
" " Rabbet		0-1-4	0-1-4	0-1-5	0-1-7	0-2-3	0-2-7	0-3-2	0-3-2	0-3-2	0-3-2	0-3-2	0-3-2	0-2-5	0-1-7	0-1-4	0-1-4	0-1-4	
" " Diagonal #1		0-11-3	2-1-6	3-0-5	3-8-0	4-1-4	4-4-4	4-5-5	4-6-2	4-6-2	4-5-7	4-4-5	4-2-7	3-10-7	3-5-5	2-10-4	2-0-7	1-0-0	
" " " #2		0-6-3	1-6-3	2-4-4	3-1-0	3-5-5	3-8-5	3-10-7	4-0-5	4-0-3	4-0-2	3-11-4	3-10-3	3-9-7	3-8-3	3-6-1	2-9-3	2-1-4	1-0-2



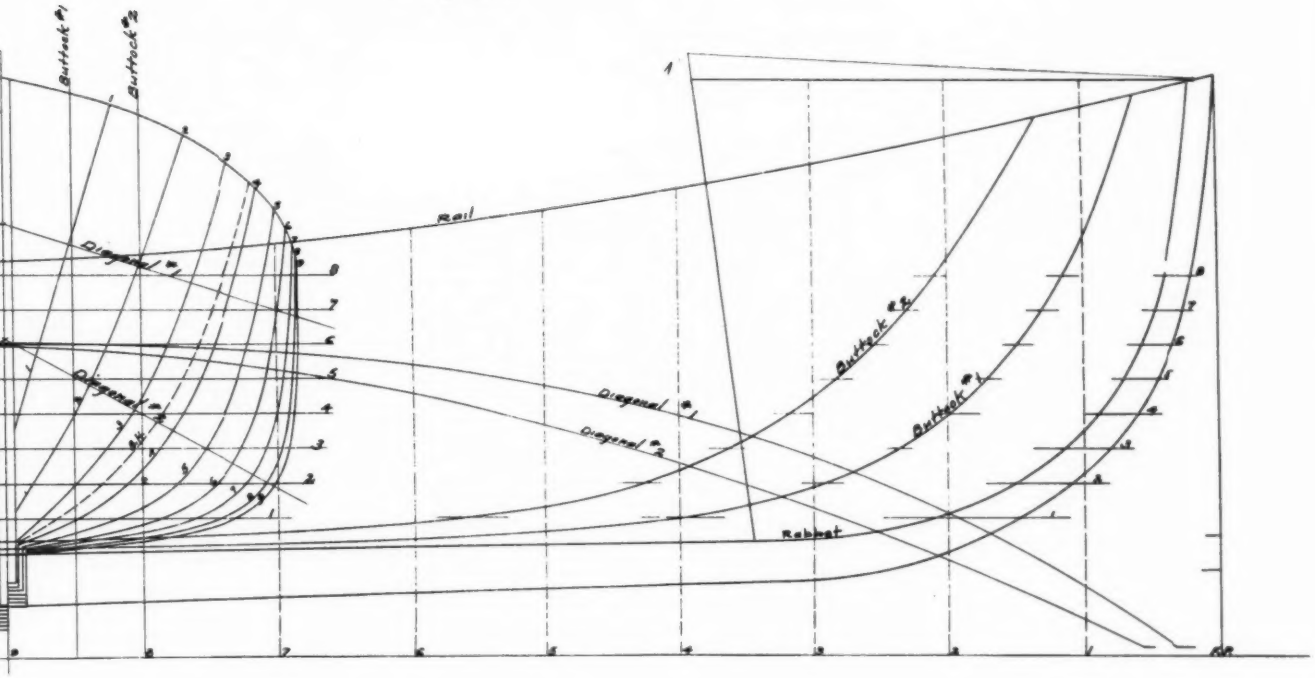
1 0 1 2 3FT.

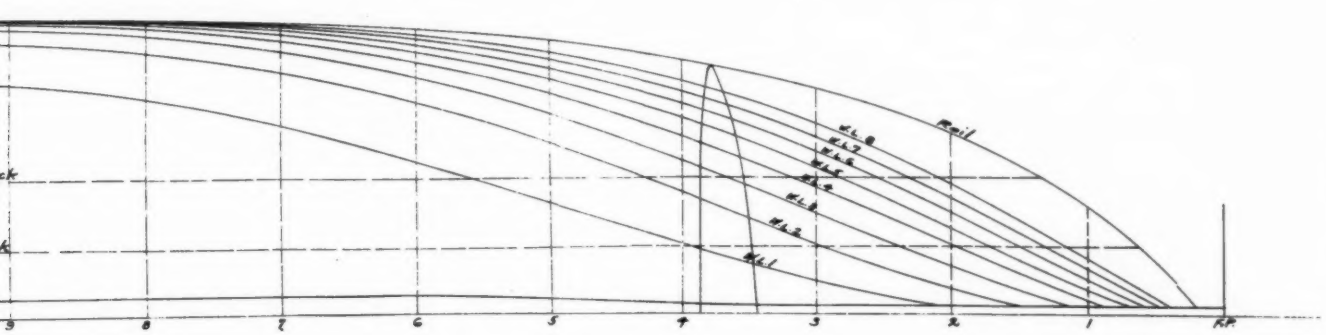
E 1.
ES.

Length over all	36'-0"
Moulded beam	8'-7½"
Depth amidship rabbet to gunwale	4'-2½"
Stations 2'-0" apart.	
Waterlines 6" "	
Buttocks 12" "	



Round of top of end boxes at any point.





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by Capt. C.H. McLellan, R.C.S. (Retired), Superintending Construction of Lifeboats, Life Saving Apparatus, etc.

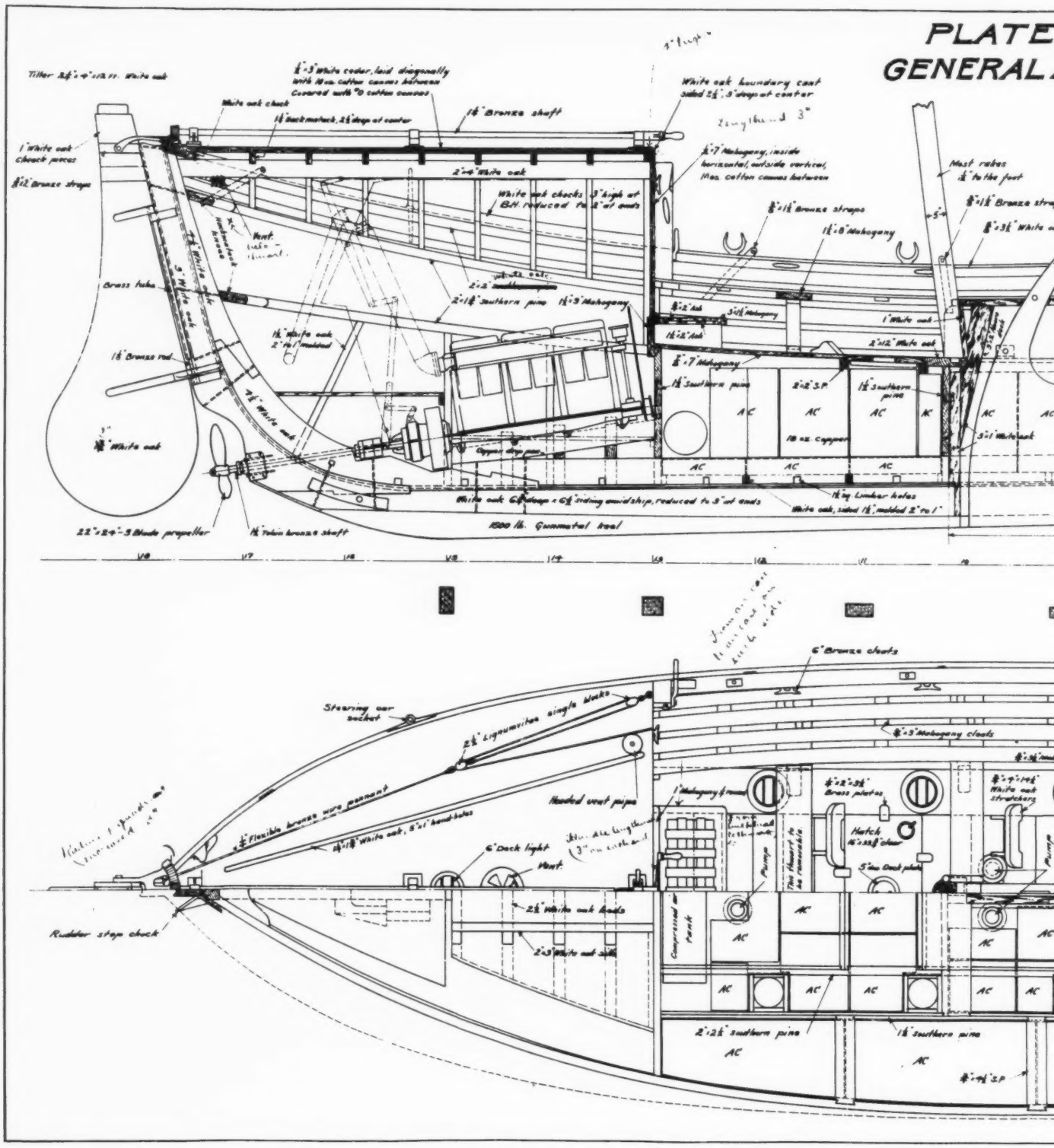
PLATE
GENERAL
Tiller 2½"x4"x12'11" White oak
1" White oak cheek pieces
⅝" Bronze straps
White oak chock
1¼" Bronze shaft
2"x6" White oak
White oak chocks 3" high at C.H. reduced to 2" at ends
Vent. Halo of thwart.
Mahogany knees
Brass tube
2"x12" Southern pine
1½" White oak 2" to 1" molded
1⅛" Bronze rod
2" White oak
Copper drip pan
22"x24"-3 Blade propeller
1¼" Tobin bronze shaft
1500 lb. Gunmetal keel
White oak boundary cant sided 2½", 3' steps at center
Lengthened 3"
⅝"x7" Mahogany, inside horizontal, outside vertical, 14oz. cotton canvas between
Mast rabbet ⅝" to the foot
⅝"x1¼" Bronze straps
1½"x6" Mahogany
⅝"x3½" White oak
1" White oak
2"x12" White oak
⅝"x7" Mahogany
1½" Southern pine
2"x2" S.P.
1½" Southern pine
AC
18 oz. Copper
3"x1" Mahogany
White oak C.H. 6" deep x 6½" siding amidship, reduced to 3" at ends
1½" sq. Limber holes
White oak, sided 1½", molded 2" to 1"
Steering oar socket
2½" Lignumvitae single block
1¼" Flexible bronze wire pennant
1½"x1½" White oak, 5'x1" hand holes
Hooked vent pipe
6" Deck light
Vent
2½" White oak knees
2"x3" White oak shelf
Rudder stop chock
6" Bronze cleats
⅝"x3" Mahogany cleats
⅝"x2"x3½" Brass plates
⅝"x7"x14½" White oak stringers
Hatch 16"x22½" clear
5'6" Deck plate
Pump
Compressed air tank
2"x12½" Southern pine
1½" Southern pine
⅝"x14½" S.P.
I 0 I 2 3 FT.

TE 2.
AL ARRANGEMENT.

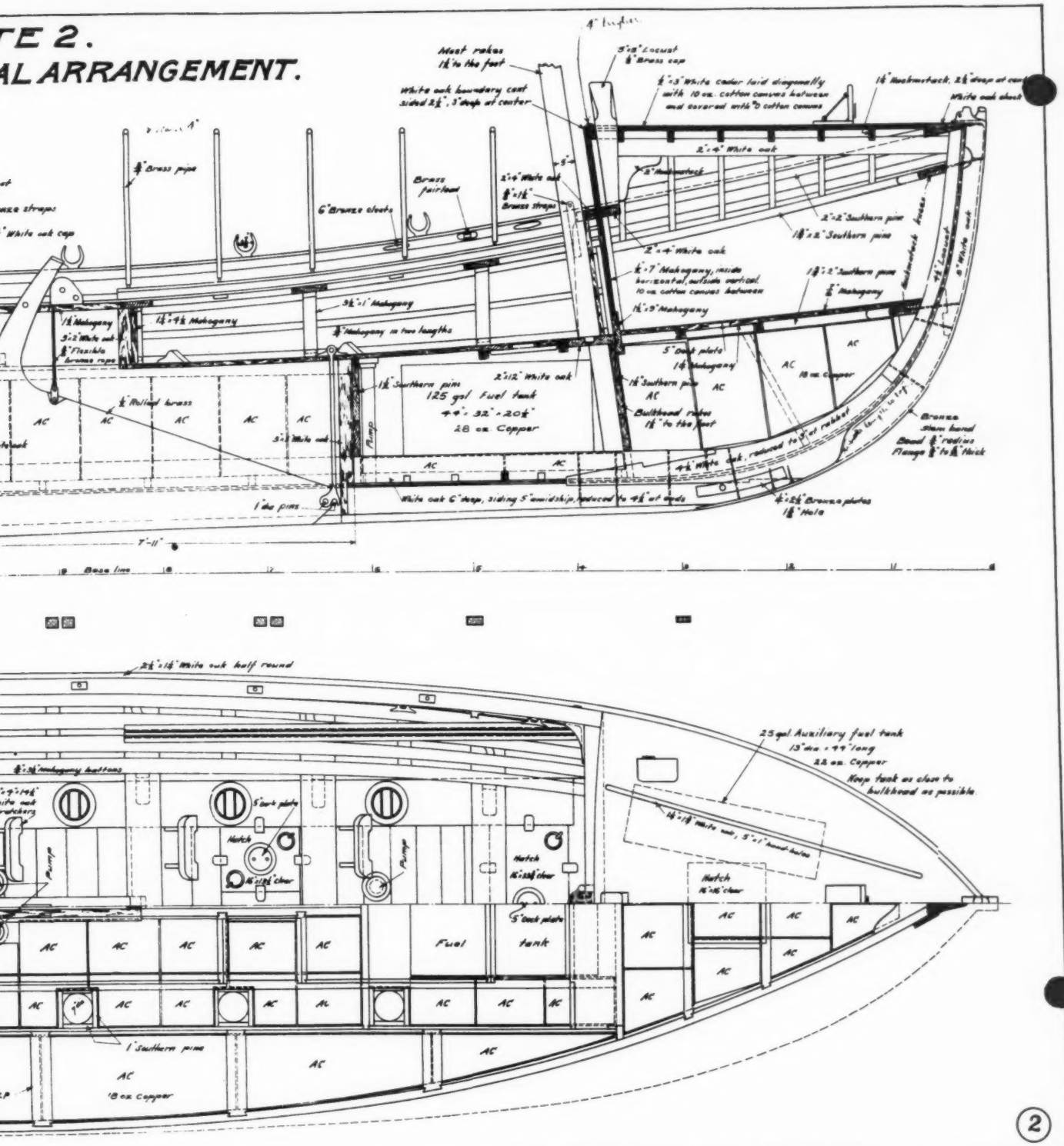

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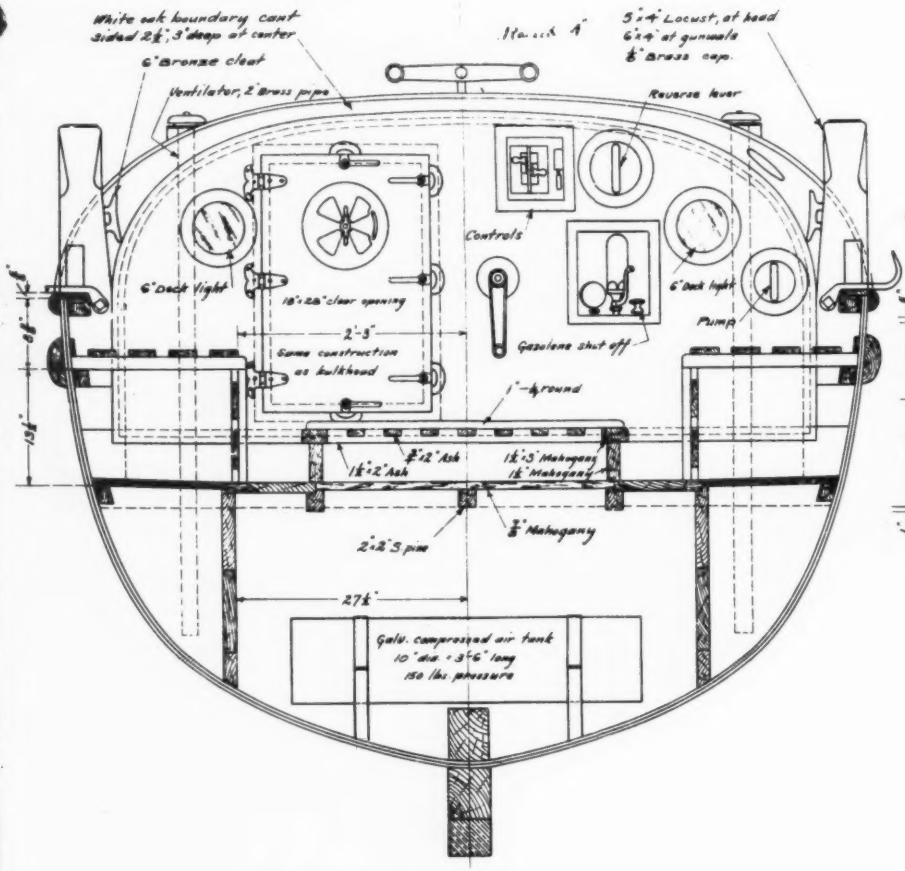
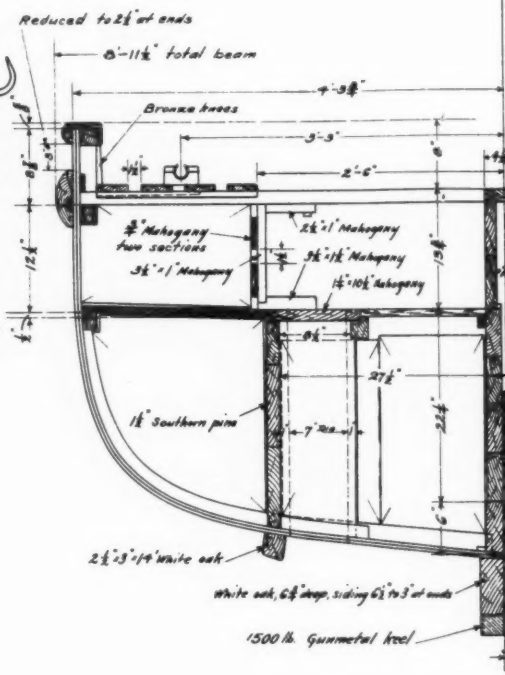
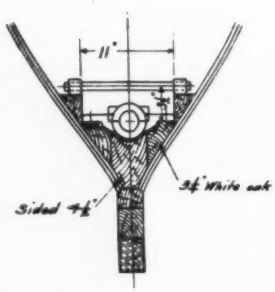
PLATE
SECTIO



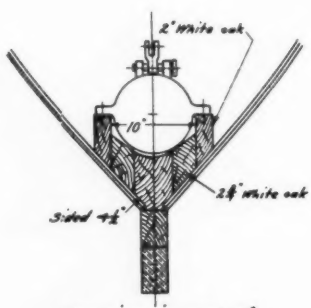
Section at After B. H. — Looking aft.



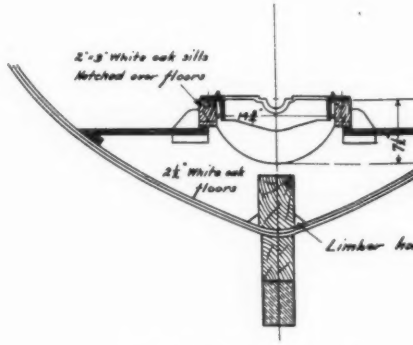
Midship



Section in way of Thrust bearing.



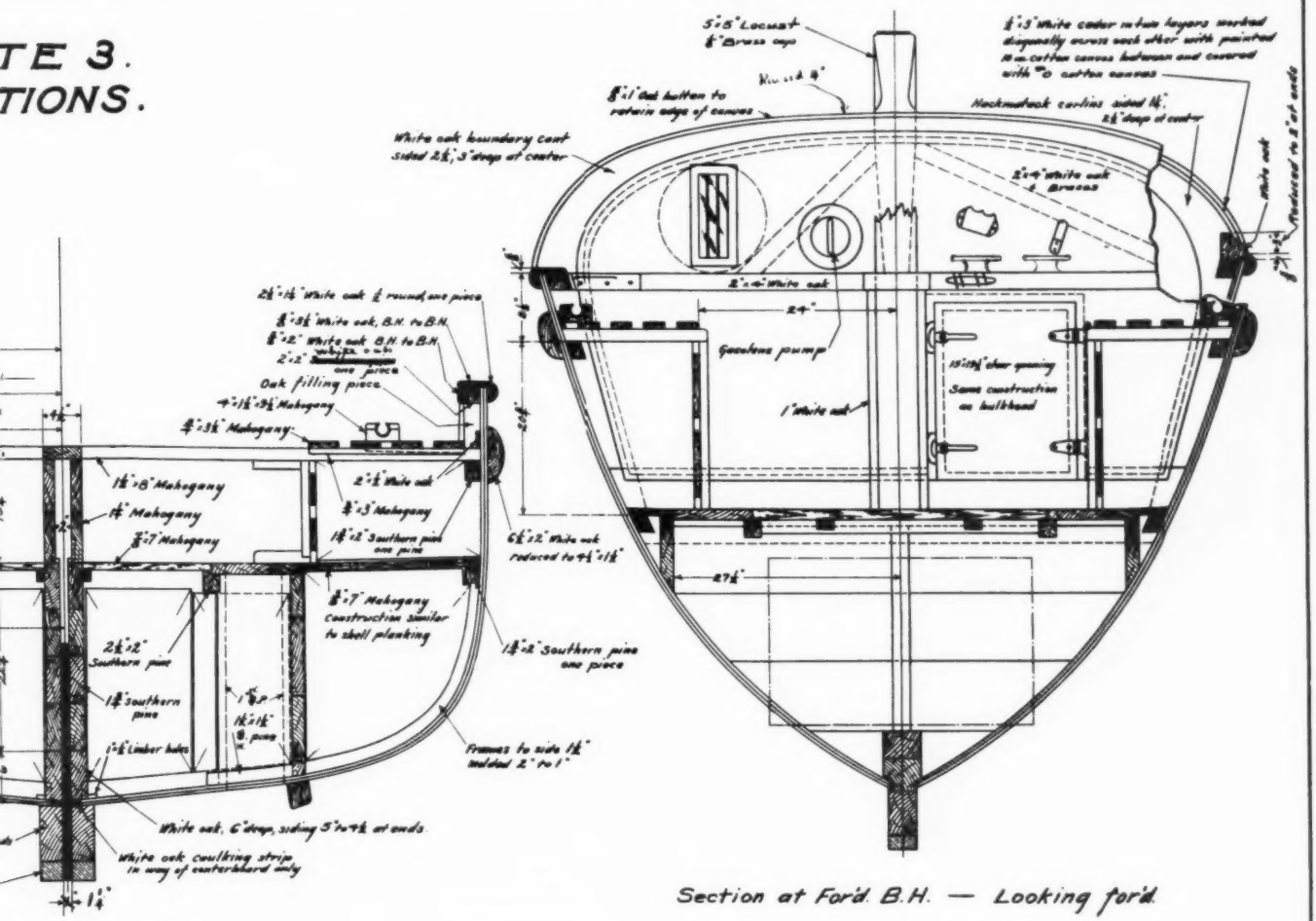
Section in way of Reverse gear.



Section at Station #14.

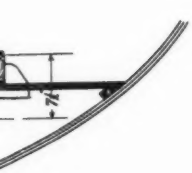
1 0 1 2 3 4FT.

TE 3.
TIONS.


5"x6" Locust
6" Brass cap
8"x1" Oak button to retain edge of canvas
White oak boundary cant sided 2½", 3' deep at center
8"x3" White cedar in two layers worked diagonally across each other with painted 10 oz. cotton canvas between and covered with "O" cotton canvas
Hackmatack cantline sided 4", 2½" deep at center
2"x4" White oak & Brasses
Make out
2"x6" White oak
24"
Gasoline pump
1" White oak
15"x25" clear opening
Same construction as bulkhead
27½"
2½"x1½" White oak ½ round one piece
8"x3½" White oak, B.H. to B.H.
8"x2" White oak, B.H. to B.H.
2"x2" White oak one piece
Oak filling piece
4"x1½"x3½" Mahogany
4"x3½" Mahogany
1½"x8" Mahogany
1" Mahogany
⅝"x7" Mahogany
2½"x2" Southern pine
1½" Southern pine
1½"x1½" S. pine
1"x2" Timber holes
2"x½" White oak
4"x3" Mahogany
1½"x2" Southern pine one piece
6½"x2" White oak reduced to 4½"x1½"
⅝"x7" Mahogany Construction similar to shell planking
1½"x2" Southern pine one piece
Frames to side 1½" molded 2" to 1"
White oak, 6" deep, siding 5" to 4½" at ends
White oak caulking strip in way of centerboard only
1¼"

Section at For'd. B.H. — Looking for'd.

dship Section



mber holes

4.

Planking.

To be ⅞" clear Honduras mahogany not over 7" wide, in two layers diagonally across each other at angle of 45° with keel.

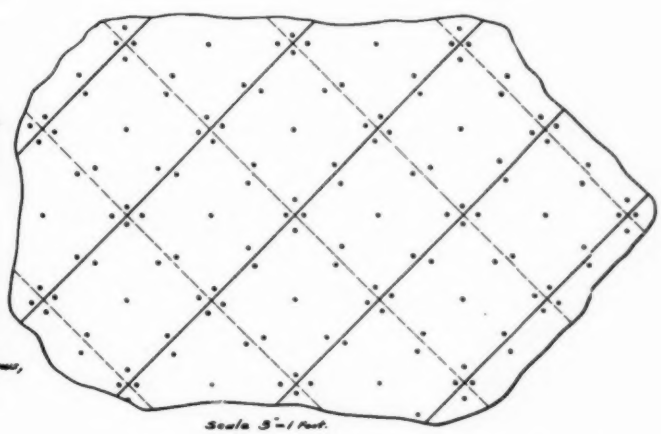
Planks to extend in one piece from gunwale to keelson in way of centerboard, from gunwale to deadwood for'd and aft, elsewhere from gunwale to gunwale.

Alternate planks to be fitted first and the remaining planks fitted as shutters.

10 oz. Cotton canvas in one piece from keel to gunwale, tightly stretched and well bedded in paint between outer and inner planking.

Fastenings in general to be No 12 gauge copper nails riveted over copper burrs. Through gunwale and risings to be No 9 gauge copper nails. Into keelson and deadwood to be No 12 - 2" brass screws, not over 1½" apart.

The heads of all fastenings on outside to be carefully countersunk to take filling.



Scale 3"=1 Foot.

Method of staggering rivets in planking.

(3)

Prepared under the direction of the General Superintendent
by Capt. C.H. McOlleen, U.S.R.C.S. (Retired), Superintending Construction of Lifeboats, Life Saving Apparatus, etc.

Two of the most interesting design features, of course, had to do with the self-bailing and self-righting qualities. The former was achieved by 10 copper relieving tubes which extended from the main deck down through the bottom and were equipped with self-acting, balanced valves allowing water to flow down and out but preventing it from coming up. Self-righting was obtained through the use of high end cases at the bow and stern, copper air cases below deck between the end boxes and along the sides under the thwarts, and a heavy bronze keel of about 1,500 pounds. The hull itself was divided into eight separate water-tight compartments. If capsized, the boat could right itself in less than half a minute.

For operating under sail, the boat was equipped with lug-rigged foresail and mainsail and a jib. Masts and yards were of spruce. The masts, of hollow construction, had one shroud on each side. The centerboard was of bronze. For pulling, the boat had 10 oars, double banked. It is anticipated that the sail plan, rigging details, and many construction features will be illustrated in a future issue of the Journal.

The gasoline engine, mounted in the aft end box, was a 6 cylinder, 4 cycle, open-base auto-marine motor designed and built by Holmes Motor Company. At approximately 700 rpm, the engine had about 40 hp and provided a maximum speed of just under 10 miles per hour. An Apple electric system provided jump spark ignition as well as current for lights, etc. The whistle operated on compressed air from the engine. There were two copper gasoline tanks: the main with a 125 gallon capacity; the auxiliary, holding 25. Gasoline was pumped, as needed, from the main tank, located in the lower hold forward of the centerboard trunk, to the auxiliary tank under the turtle back of the forward air case. By gravity feed, fuel reached the engine from the auxiliary tank through a pipe running down through the bottom, aft along the keel close to the garboard seam, and up through the bottom again to the carburetor. Water-tight stuffing boxes surrounded the points where the fuel line went through the hull.

Construction details, materials, and scantlings are well detailed on the plans and will not be commented on here except to make note of the fact that all fastenings were copper nails and bolts, muntz metal bolts, and brass screws. No iron fastenings were permitted.

Painting instructions indicate that the bottom up to the waterline was green; topsides, decks and interior, varnish; tops to the end boxes, white. Lettering on top of the end boxes was in black while on the hull, in gilt.

I wish to acknowledge the generous co-operation received from the National Archives and the U. S. Coast Guard Headquarters. Both of these organizations were extremely helpful in providing source data, plans, and photographs.

Note: The three sheets of lifeboat plans, probably the most detailed drawings we have published, are reproduced by courtesy of the National Archives.

The large size of the originals enabled boatbuilders to take dimensions right off the drawings. We have added graphic scales for the convenience of model builders.

-Ed.

THE SPRITSAIL TOPMAST OF THE *ST. GEORGE* MODEL

A BRIEF HISTORY OF THE SPRITSAIL TOPMAST

BY DONALD M. HERNON

Significant changes occurred in fields of ordnance, tactics, hull design, and rigging in the years following the defeat of the Spanish Armada in 1588. This article deals with one such change in rigging; specifically, the development, uses, and the supersedure of the spritsail topmast.

One may speculate as to how the spritsail topmast developed. The ordinary topmast is thought to have evolved from the jackstaff carried at the end of the lower mast. There is no evidence, however, to definitely prove that the spritsail topmast originated in the same way. The theory as to its beginning is logical, nevertheless, since there was a jackstaff set on the bowsprit, with a small sail set on it upon occasion.

As in the case of any evolution, there is no exact date at which it can be said that the spritsail topmast was invented. R. C. Anderson likes to set the round figure of 1600 for the beginning of the era for two reasons. First, because the beginning of the seventeenth century is the approximate limit of detailed rigging knowledge; and second, because this is the earliest date at which the fitting can be identified.

Further investigation substantiates this opinion. The title pages in two Dutch books depict ships with spritsail topmasts. One, an account of the attempt of five ships to sail to India from Rotterdam via the Straits of Magellan, was edited in 1660. The other, a record of Oliver van Noort's voyage (1598-1601), was edited in 1602. No reference to the spritsail topmast occurs in the body of the texts, but these references to that fitting in the title pages indicate that it was at least known, if not in general use.

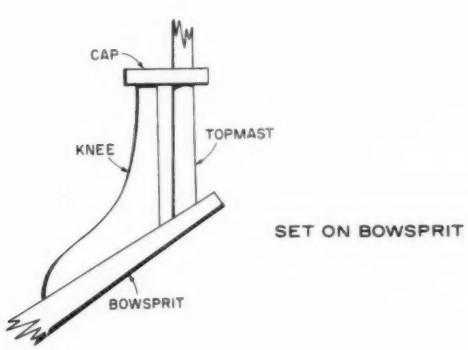
A contemporary account of battles between English and Danish ships during Christian IV's expedition to northern Norway in 1599 gives conclusive evidence of the spritsail topmast. This states: "...the top of our bowsprit was broken in pieces..." and "...she set her topsail... on her bowsprit above the spritsail..."

A picture credited to Vroom, which is also dated 1599, shows the arrival of four East Indiamen in July of that year. Two of the ships carry the spritsail topmast. Finally, a Dutch book of 1604, poetically describing the capture of Sluys, contains a print of a number of three-masted ships, one of which is fitted with a spritsail topmast.

The year 1600, then, is an accurate, as well as convenient, date for the beginning of the spritsail-topmast period. However, there was a period of time between the first appearance of this fitting and its official acceptance and ensuing wide-spread use. The British Admiralty appointed a commission in 1618 to investigate the abuses of the Navy. Besides having ten new ships built, this commission modernized the old ships; a case in point being the BEAR, whose old spars are listed on folio 29 of a manuscript at the Admiralty library. She did not carry the spritsail topmast. In the recommendation submitted, the BEAR was to be fitted with a spritsail topmast, as well as the more modern topgallant sails on the fore and main masts. In smaller ships such as the MOONE, the LYEN'S WHELPE, and the SEVEN STARRS, the spritsail topmast and main topgallant sails were to be added, neglecting the fore topgallant sail. After this commission of 1618, the spritsail topmast was recognized as a required fitting and, as such, was carried on British men-of-war and merchantmen.

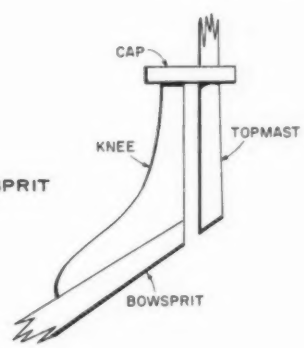
Before proceeding further in the discussion of the spritsail topmast, it is necessary to have a clear understanding of its construction and to determine the purpose of the network of blocks and lines connected with the bowsprit. This running rigging was the most complicated part of seventeenth century rigging.

The spritsail topmast was essentially a vertical mast stepped on the end of the bowsprit. It stood in a cap which was secured to the top of a knee, which in turn was made fast to the outer end of the bowsprit. The heel of the mast was set either on the bowsprit-end, or just beyond the bowsprit-end, according to date. With regard to English ships up to 1675, the spritsail topmast was set on the bowsprit; after that date it was set beyond the bowsprit. This knee-cap arrangement lent the requi-



SET ON BOWSPRIT

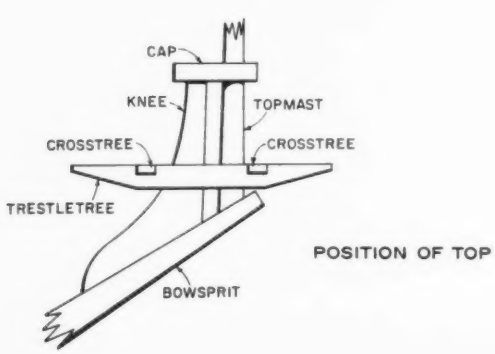
SET BEYOND BOWSPRIT



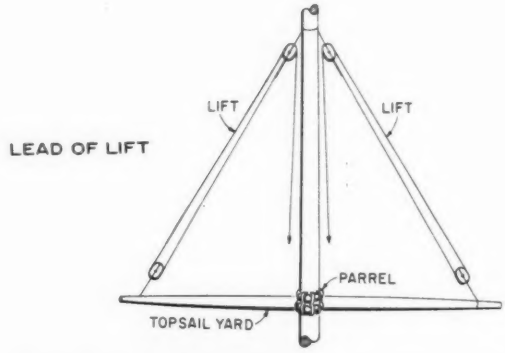
site support to physically hold up the mast. To guy the mast, certain standing ropes were used: namely, the shrouds and a craneline or backstay. Normally, three shrouds to a side were used to guy the mast athwartship. These shrouds were attached, through a block, to the head of the topmast; coming down, the shrouds ended in deadeyes fastened through the top to iron crosstrees, which ran under the bowsprit. The top itself was a circular horizontal platform, which was obviously helpful to any seaman working forward on the spritsail topsail. Its construction is both interesting and simple. A trestletree was attached on either side of the knee in the fore-and-aft direction; wooden crosstrees were laid across the trestletrees to form the base for the circular top, with the iron crosstrees bearing the strain from below. The craneline served to guy the mast in the aft direction. It is very important to note that there was no forward stay, as there was certainly no place for it to lead. This backstay, or craneline, normally led from the topmast head to the fore topmast stay, where it was secured by a crowsfeet arrangement to spread out the strain over a large segment of the stay. This crowsfeet arrangement varied from ship to ship and nation to nation throughout the period, but in 1675 Keltridge required eight blocks, and ten years later Battine listed ten for large ships and eight or six for smaller ships.

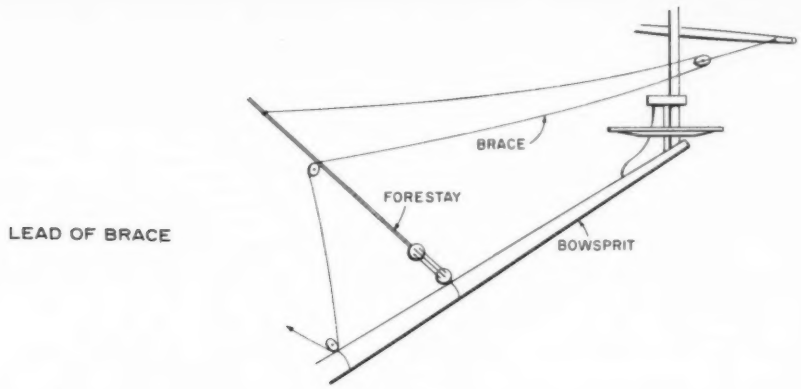
The running rigging was at once functional, complex, and constantly changing. The yard, fitted across, was fastened to the topmast by a parrel, a lashing and wooden truck arrangement that permitted the yard to be hoisted up and down the topmast by means of the tie and halliard through the topmast head. The lifts ran between the ends of the yard and the topmast head and were thus able to control the angle of tilt of the yard in the vertical athwartships plane. To control the tilt of the yard in the horizontal plane was the function of the braces, which led from the forestay through a block on each end of the yard, then back to the forestay, and finally (along with the lifts) down to the range, a pinrail set just aft of the point where the bowsprit joined the head of the ship. Since both the lifts and braces were taken to the range, the yard and the spritsail topsail,once they were hoisted or set, were controlled from the forward part of the ship, thus alleviating the necessity for seamen to be on the bowsprit in normal maneuvering. To either set or secure the spritsail topsail did require men on the top, a dangerous position, especially when sailing close hauled into a good sea.

Freedom of movement of the yard in all planes was permitted by the parrel and running rigging. The spritsail topsail, being itself bent to the yard by robands (lashings) through the head of the sail and around the yard, also had some freedom of movement. This sail was quadrilateral, cut square on the head and foot, and approximately half the size of the spritsail. Its shape was adjusted to conform with the prevailing wind through the use of two lines, the sheets and the clewlines, and also by the position of the yard. The yard's movements were determined primarily by the lifts and braces. Each sheet served also as a spritsail lift and led from the topsail clew through a block on the end of the spritsail yard, then forward to a block on the outer end of the bowsprit, and finally aft to the pinrail. The



POSITION OF TOP





clewline ran from the clew to the block in the middle of the topsail yard, closer in to the tie rather than to the lift, and then aft to the pinrail. Since the sheets pulled down and aft from the clews, while the clewlines pulled up, these together enabled the sail to be trimmed properly.

One line that was carried on most sails was missing from the spritsail topsail - the bowline, which was attached in a crowsfeet arrangement to the luff of the other sails. This line flattened the billowy sails when the ship was on the wind; the lack of it on the spritsail topsail, since there was no possible way to lead it forward, reduced the sail's effectiveness when sailing closehauled.

Through the study of the rigging of the spritsail topmast and its sail, the complexity of the fitting has become obvious. Exactly what did such a small sail on the end of the bowsprit accomplish? Were the results achieved significant enough to balance out the difficulty of using the sail? To answer these points first required a general picture of the maneuvering capabilities of the seventeenth century sailing ship. The square-rigged ship was slow and incapable of sailing close to the wind - a modern example being the trial of the NEW MAYFLOWER in 1957, "..she made about four and a half knots...sailed close hauled about six points off the wind..." The headsails (those sails belonging to the foremast and bowsprit) kept the ship off the wind, while the after sails (those sails belonging to the main and mizzen masts) made the ship come up on the wind; thus a balance between the head and after sails had to be reached.

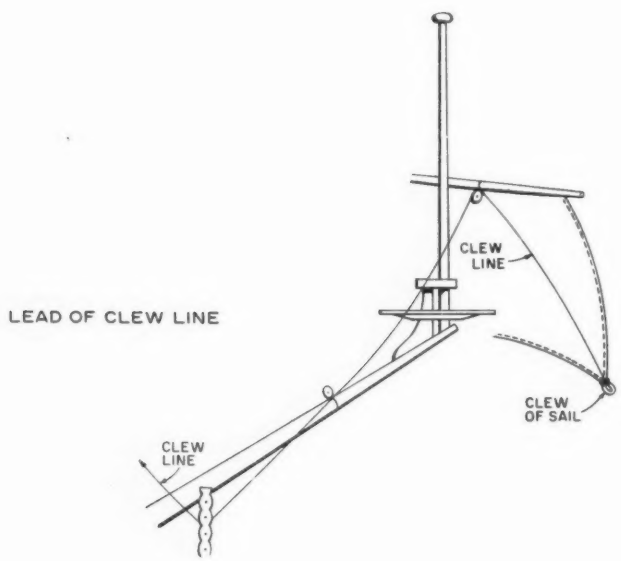
These sailing characteristics hint at the purpose of the spritsail topmast and its sail. Tacking (bringing the head of the ship through the wind) was a difficult maneuver, even in a good breeze; in a light wind it was almost impossible prior to the spritsail topsail. Situated at the end of the bowsprit, the small spritsail had a large lever arm through which to exert its force. Applied at the correct time, the moment produced was sufficient to bring the ship's head through the eye of the wind.

An analysis of the tacking procedure is interesting to follow, since the role of spritsail topsail was clearly shown in that maneuver. Assume that the ship was sailing as close to the wind as possible (six points) on the starboard tack; the yards were braced with the port side aft, starboard side forward; bowlines flattened all the sails, except those on the bowsprit, to produce a more effective airfoil; having no bowlines, the spritsail and spritsail topsail yards were lifted so that the leeward side was higher (similar to a lateen sail). Then came the order to tack: the helm was put to leeward, and the ship came up to the wind, utilizing her momentum to carry her up. The ship then went into stays or backstays, with her sail against the shrouds

and masts, the wind being from the port bow slightly. In this condition the wind tended to kill the ship's way and make the helm ineffective; it was time to shift the spritsail topsail to the port tack to get the needed moment to swing the ship's head. Letting fly the old leeward sheet, lift, brace, and clewline, while hauling in on the new leeward lines the topsail was brought around, and as the wind caught it, the ship's bow came through; quickly the other sails were brought around and trimmed for the port tack. Thus opportune use of the spritsail topsail eased the difficulty of tacking, especially in light airs, when the ship had little way on.

Maneuvering with a spritsail topsail was not without its hazards, however; the worst possible situation occurred if a heavy wind from forward caught the topsail with the yard braced square. Such a condition produced a force directly aft, and only the wood of the mast opposed this force. If the topmast carried away, the bowsprit and the foremast were soon to follow, especially in a rough sea, since the forestay led to the bowsprit below the knee, and the fore topstay was made fast to the knee and bowsprit. This inherent danger caused the spritsail topmast to be left ashore during winter cruising, when the danger of storms was the greatest. During sea battles the spritsail topsail was not often set, since it was hard to handle and required the use of men who were needed to handle the bulky guns of the era. The obvious advantage of the spritsail topsail, set on the precarious topmast, was lost to ships during these periods. The way was paved for improvement on the topmast rig.

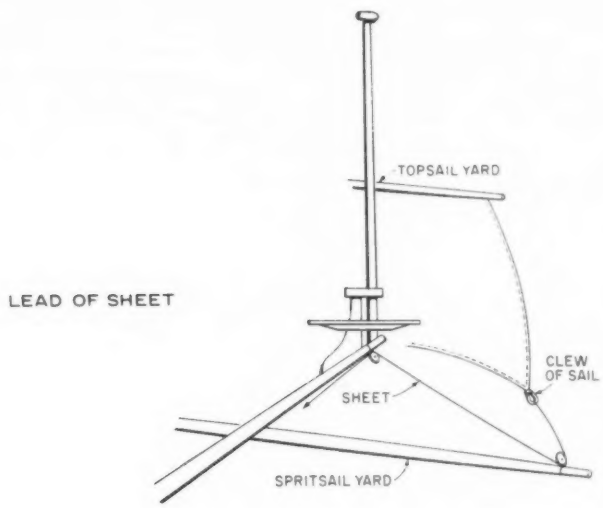
Toward the end of the seventeenth century, developments occurred that led to the supersedure of the spritsail topmast. As in the case of its evolution, its decline required many years to be finally completed. The advent of fore-and-aft triangular sails, which eventually spelled the defeat of the spritsail topmast, was first seen in Dutch ships. The Low Countries, with their many rivers and restricted waterways, made the practice of beating to windward a daily necessity; the triangular headsail, less complex, and more effective than the square headsail when on the wind, came to be used on numerous fore-and-aft sloops, and it was from these vessels that the usage spread to the full-rigged ships. The Dutch HOLLANDIA was the flagship of Admirals de Ruyter and Cornelius van Tromp, and as such, received the innovation first; she



was fitted with triangular staysails on the mainmast, but not on the foremast, in the period 1665-1683. In the German HOFFNING VON LUBECK of 1686, a triangular headsail was fitted, along with the spritsail topmast. Such an arrangement must have been very unwieldy; at least it closely limited the size of the triangular sails fitted on the ship's head.

The next step was to extend a jib-boom up the bowsprit, past the ever-fitted topmast, giving a better lead for the fore stay, if not solving the problem. The English ROYAL WILLIAM, built in 1692, rebuilt in 1719, carried the transitional rig, which limited the effectiveness of both the spritsail topsail and the triangular head sails.

An obvious (or so it seems now) solution was to abolish the spritsail topmast, carrying the topsail yard under the jib-boom: this removed any interference with the up-and-coming jibs. A 56-gun Dutch ship was so fitted about 1700, but the English persisted in carrying the spritsail topmast and jib-boom on three-deckers until 1750, although the topmast was officially abolished on all two-deckers,and smaller, in 1719. Thus occurred the abandonment of the spritsail topmast, "justly rejected as inconvenient and dangerous to the bowsprit, although serviceable in light breezes."



(Note: The author originally included a large number of footnotes indicating the sources of his principal statements. Because of the difficulties in printing these properly in the Journal, they have been omitted altogether, but a listing of the major authorities is given below. -Ed.)

Primary sources of information concerning seventeenth century ship rigging are cast in various forms. By far the most useful type is the contemporary ship model. However, there are few completely contemporary models in existence, most having been re-rigged by someone, anyone, with the truth obviously suffering.

In 1938, the United States Naval Academy at Annapolis received the Henry Huddleston Rogers Collection of Ship Models. Ten of these models, including three from the famed Charles Sergison's Cuckfield Collection, are fitted with spritsail topmasts. Of these models, only one, the ST. GEORGE, an English second-rate of 96 guns of 1701, has completely contemporary rigging. This model is the best possible primary source

for the end of the period studied.

Certain manuscripts of that era are available for study and, used in conjunction with the ship models, enable the student to distinguish the uses of the lines and blocks. (With reference to sails, the models have the sheets, clewlines, and bowlines led to various points in the rigging, making their uses uncertain without consulting contemporary documents.) The anonymous "A Treatise on Rigging", written about the year 1625, is by far the most detailed and most valuable account of rigging in the early seventeenth century. A modern reprint was edited by R. C. Anderson (London 1921). Capt. John Smith's "The Sea-Mans Grammer and Dictionary" (London, 1692) is the second best primary source; its rigging descriptions closely concur with the lines and blocks seen on the ST. GEORGE model. The "Treatise", Smith's "Grammer", and the ST. GEORGE form the nucleus of information used to gain the initial understanding of rigging.

Studying the maneuvering characteristics requires a knowledge of the action of the ship itself. Sir Henry Mainwaring's "The Seaman's Dictionary" (London, 1644) - as reprinted in "The Life and Works of Sir Henry Mainwaring", G. E. Manwaring and W. G. Perrin, Ed. (London, 1922) - and "An Universal Dictionary of the Marine" by William Falconer (London, 1789) are very explicit on tacking, and together with Smith's "Grammer", provide mutually supporting evidence. The definitions these works give, when used with the model, solve the problem of determining exactly how the spritsail topsail was set, trimmed, and used.

R. C. Anderson, in his books "The Rigging of Ships in the Days of the Spritsail Topmast 1600-1720" (Salem, 1927) and "Seventeenth Century Rigging" (London, 1955), falls back on the primary sources evaluated previously, and especially on the ST. GEORGE model, which was in his care for two years prior to the writing of the first book.

The discussions and articles in the "Mariner's Mirror" are especially interesting. The best series is by Alan Moore, "Rigging in the Seventeenth Century", September, 1912; January, 1913; and November, 1913. These cover the entire era and are another interpretation of the primary sources, though not nearly as detailed.

The following sources are of value as background material; some contain a few specific points, but are not detailed enough to be considered major sources:

Baker, William A. - "The New Mayflower" (Barre, Mass., 1958)
"Catalog of the Henry Huddleston Rogers Collection of Ship Models" (Annapolis, 1954)
Chatterton, E. Keble - "Sailing Models" (London, 1934)
"Ship Models" (London, 1923)
Clowes, G. S. Laird - "Sailing Ships" (London, 1930-32)
Culver, Henry B. - "Contemporary Scale Models of Vessels of the Seventeenth Century" (New York, 1926)
G. E. Manwaring and W. G. Perrin, Ed. - "The Life and Works of Sir Henry Mainwaring" (London, 1922)
"Mariner's Mirror" (London, 1911 -) Various issues
Moore, Sir Alan - "The Last Days of Mast and Sail" (Oxford, 1925)
Nance, R. Morton - "Sailing Ship Models" (London, 1949)
Paris, Le Vice Admiral - "Souveniers de Marine" (Paris, 1886)
Smith, Capt. John - "An Accidence or the Pathway to Experience" (London, 1626) Ed. by Edward Arber and reprinted in "Travels and Works of Captain John Smith" (Edinburgh, 1910)
Steel, D. - "Elements of Mastmaking, Sailmaking and Rigging, 1794" Ed. by Claude S. Gill (London, 1932)
Sutherland, William - "Britain's Glory: Or Ship Building Unvail'd" (London, 1729)

NOTES AND COMMENTS

GUNS FOR THE SOVEREIGN OF THE SEAS.

I was quite interested in Cary S. Tucker's reconstructed guns for the SOVEREIGN (Nautical Research Journal, Vol. 10, p. 123), and although he is not satisfied with the accuracy of the list of armament given in the Science Museum catalog, I feel that it might have been better to have included the entire list in his article. "The Administration of the Royal Navy, 1509-1660" by M. Oppenheim gives the same list as that shown in the catalog and is taken from state papers. I am including it below:

	Number	Length each Feet	Weight each Cwt.
Lower tier			
Luffs, quarters and sides	20 cannon drakes	9	45
Stern chasers	4 demi-cannon drakes	12 1/2	53
Fore chasers	2 " " "	11 1/2	48
Bows abaft the chase	2 " " "	10	44
Middle tier			
Luffs, quarters and sides	24 culverin drakes	8 1/2	28
Fore chase	2 culverins	11 1/2	48
After chase	4 "	11 1/2	48
Upper tier			
Sides	24 demi-culverin drakes	8 1/2	18
Fore chase	2 demi-culverins	10	30
After chase	2 " "	10	30
Forecastle	8 demi-culverin drakes	9	20
Half-deck	6 " " "	9	20
Quarter-deck	2 " " "	5 1/2	8
Bulkhead abaft the forecastle	2 culverin drakes	5 1/2	11

The reader will note the short lengths of some of the culverin drakes and demi-culverin drakes and the extreme lightness of weights as compared with culverins and demi-culverins. I think that this shows that some, if not all, of the drakes were shorter and of lighter metal than the standard type guns at that time. This would account for the lightness to the Spanish barraco which Mr. Tucker shows in his drawings. The extreme lengths of the pieces, especially the culverins and demi-culverins, do appear extremely long, as Mr. Tucker says, and it is quite possible that these lengths were total; that is, length breech band to muzzle plus length of cascabel, although the general policy was to give the length of the gun as that from breech band to muzzle. Ordinarily, the end of the cascabel was at about the end of the carriage as shown, but in a lot of the old drawings (Science Museum - "Sailing Ships" Part 1, p. 78) the length from the center of the trunnion to the end of the cascabel appears to be approximately 1/2 the length (total) of the gun. This, in general gun construction, was only 3/7 of the length b.b. to muzzle plus length of cascabel. It is, therefore, quite possible that guns at this time were much longer than those of the 18th century and were longer from the center of the trunnion to the end of the cascabel; i.e. length center cascabel to muzzle times 2 equals total length of gun. The English preferred unchambered drakes; however, some of the drakes resembled the

perrier type.

-Edwin Newell Rich

The book about the SOVEREIGN OF THE SEAS, referred to in Mr. Tucker's article, is probably "The Portrait of Peter Pett and The Sovereign of the Seas" by Geoffrey Callendar; Yelf Brothers, Ltd., Newport, Isle of Wight, 1930. For whatever my opinion may be worth, I would venture to say that her armament consisted of 24's on the lower deck, 18's or 12's on the middle deck, and perhaps 9's on the upper.

A beautiful feature of this book is the enlarged reproduction of the Van de Velde drawing of the ship. And what stimulates bemused speculation in me is the size of the guns in the half-deck bulkhead. How they could have been fired at an enemy boarding party without also smashing the ship itself to an appreciable degree is by no means apparent to me - unless they were only loaded with grapeshot.

-James Ferguson

The book mentioned is "The Portrait of Peter Pett and the Sovereign of the Seas" by Geoffrey Callendar. It includes a 13 1/2" x 26" reproduction of a Van de Velde the Elder drawing and numerous other plates and is available from: The National Maritime Museum, Greenwich S.E. 10, England.

Another book with pictures of the ship is: "Ship Models" by Richard B. K. McLanathan, available from: Museum of Fine Arts, Boston, Mass. This beautiful book was reviewed in an earlier number of the Journal.

Elizabeth died long before (in 1603), but the relatively slow change in ordnance would suggest that authorities of that date would be useful sources for 1637, although the SOVEREIGN would have been provided with the most modern pieces then available.

-Edward Von der Porten

(Note: Several other readers suggested that Mr. Tucker probably had the Callendar book in mind. -Ed.)

LARGE SIDEWHEELERS:

The review of the COMMONWEALTH book (Nautical Research Journal, Vol. 11, p. 24) contains a statement that cannot go unchallenged. This claimed the COMMONWEALTH was the largest sidewheeler ever built after the GREAT EASTERN was launched in 1858. Now this may have been so in 1907, but (to name one of several) how about the large Great Lakes sidewheelers such as the CITY OF DETROIT III? She was 455 ft. B.P., 55 1/2 ft. over the hull, and about 85 ft. over the guards. The SEEANDBEE was 484 1/2 ft. B.P., 58 ft. beam and 100 ft. over the guards. The sister ships GREATER BUFFALO and GREATER DETROIT measured 550 ft. B.P. and 100 ft. over the guards.

-William Tobin

RESEARCH FACILITIES AT THE SMITHSONIAN.

We wish to encourage researchers to visit us and use the material here. We have devices for taking off the lines of half-models, and anyone who desires to call and inspect these will be welcome.

-Howard I. Chapelle, Curator
Division of Transportation
Smithsonian Institution
Washington 25, D. C.

CASTING THE LEAD AND OTHER FEATS OF SEAMANSHIP.

Contrary to the opinion of the cook of the PURNELL T. WHITE, as expressed in James S. McCullough's interesting article (Nautical Research Journal, Vol. 10 p. 114), the mate of that vessel was not alone in getting a cast of the deep sea lead from the windward side. I have known of others who maintained that unless the water was very deep a ship could be handled so as to get a good cast from the windward, and who said if the line was taken around the stern it was liable to foul between the rudder and the sternpost. On the other hand, some said that in deep water the lee yardarm (the yard having been previously braced approximately square in order to deaden the ship's way) was the only proper place from which to heave the lead.

Inasmuch as an angle of about 5^{o} from a perpendicular only causes an error of 1/2% and one of 10^{o} only about 1 1/2%, it would seem that an excessive importance was attributed to plumbness, the more so since deep-water sounding at the best was not a precise process and because the hair-splitters were not even conscious of errors which were probably more serious.

Anatole France said it was not easy to discover a reason for the acts of government bodies, and it was not easy to discover a rational foundation for many of the ideas of old seamen, which they nevertheless embraced as a tenet of faith beyond which no salvation was possible. I have in mind such as: that a fore lower topsail carried while scudding depressed the ship's head while a main lower topsail did not; that a ship making a stern board (and a stern board only) tended to fall off because she drew more aft than forward; that when a ship heeled she griped against her lee bow because of "the water rushing against her lee bow" - as if a ship would take the path of most resistance - and many others.

Their navigational processes were often almost incredibly slipshod and careless. And this seemed to persist until the last dog was hung, for a friend who was in an Erikson ship in the 1920's told me that during a rather lengthy period the vessel lay in an Australian port, in spite of her having no wireless, her master made no effort to rate her chronometers.

-D. L. Dennis

SPEED UNDER SAIL (see Editorial, Vol. 11, p. 5).

Sharp and fast sailing vessels do require skill in design, of course, but the hardest design is in the production of a carrier with a good turn of speed, plus handiness. This is true even in modern diesel-powered fishing vessels. The sharp model is beautiful and attracts many. But the fast carrier may also be attractive, and the power and strength suggested in the lines of a freighting ship, packet, Down-easter, or coaster deserve appreciation. So does the small vessel. There is too much emphasis on the large ships and not enough on the small vessels. We know a great deal about the large freighting ship, 1790 to 1890, and about the Baltimore clipper, the clipper ship, and the packets. But how much do we know and how much is in print on the river sailing craft, the small coasters and the sailing lighters, pilot boats, water boats, coastal packets, and other small service craft?

-Howard I. Chapelle

BOOK REVIEWS

GEORGE WASHINGTON'S NAVY: Being An Account of His Excellency's Fleet in New England Waters - By William Bell Clark. Illustrated. ix + 275 pp. Baton Rouge: Louisiana State University Press. $5.00

Mr. Clark, an authority on naval warfare during the American Revolution, has now written a thoroughly documented history of the small fleet that George Washington sent out to harass British shipping around embattled Boston. This is not a naval history of slam-bang actions, such as Jones's forays in the British Isles, but a vigorous description of the everyday events that are often shoved off the page for more dramatic effects. It is a record of heroes and fools, of daring captures and shameful cruises, of successes and failures, and all enmeshed in the tentacles of bureaucracy that were finally to cause even the patient Washington to throw up his hands.

The history of the small vessels that preceded the Continental Navy has not been ignored by other writers, but Mr. Clark introduces new evidence and a fresh viewpoint. He maintains that it was Washington himself (not Captain John Manley, as John Adams was to claim over and over again in his later years) who saw the importance of further hampering the British bottled up in Boston by intercepting their transports. Such tactics were undoubtedly obvious to many. If the Americans had few hopes for capturing formidable men-of-war, they knew they might seize some of the unarmed wood and provision ships slipping in from Nova Scotia or an unescorted transport from England. Two wood sloops and an armed schooner had already been taken in June - proof enough, if any was needed. So, in the summer of 1775, the Commander in Chief issued orders for the hiring of the first vessel. She was the HANNAH, a 78 ton schooner owned by Colonel John Glover of the Massachusetts regiment. Soldiers from this force were to man her.

The Continentals set about converting the HANNAH into a man-of-war with a matter-of-factness that reveals how little ordinary merchantmen differed from naval vessels. Carpenters cut gunports in the HANNAH's bulwarks; topsails and a flying jib, not usually carried, were added to increase her speed; and four 4 lb. carriage guns and a few swivels were supplied from the Glover warehouse. According to sacred tradition, the HANNAH should have swept the British from the sea. The fact is, however, she managed to take only one prize, the ship UNITY, before being chased ashore near Beverly. And the UNITY proved to be a recapture and was restored to her American owners. Upon learning this, the HANNAH's crew, who had had visions of astronomical payments of prize money, erupted into open mutiny. Washington had them seized and court-martialed.

These doleful episodes were not repeated on all the ships Washington sent out from New England ports, but they were typical enough. The sullen men were more interested in the profitable privateers. Their contempt for duty afloat was matched by the avarice of the naval agents ashore. The agents bickering over the disposition of the prizes, and the controversies over the prize money resulted in endless delays that fanned the resentment of the men. These wrongs were aggravated still more when agents appointed by Congress superseded those named by Washington.

Nevertheless, the "rascally privateersmen" (as His Excellency referred to them) captured a total of 55 ships. A few cargoes were worthless, but others (as His Excellency had yearned) gave "new life to the camp, and an immediate turn to the issue of

this campaign." On November 28, 1775, Captain John Manley seized the ordnance brig NANCY, and "as Washington leafed through the pages of the invoice of military stores his spirits rose and he was truly thankful 'for the instance of Divine favour; for nothing surely ever came more apropos.'" The Navy (which never numbered more than six ships) while belaboring Washington's patience, fully justified his original faith until the fall of 1776, when he could no longer give it sufficient attention. By that time, he was far from the scene of its operations and was trying to rally the Continental forces after being routed by the Howes on Long Island.

Written with clarity and scholarship, humor and understanding,"George Washington's Navy" is an important addition to Mr. Clark's other books on the Revolution. Once again, students of this era are indebted to a university press for making a fine book available.

-Roy Rogers

PLANK-ON-FRAME MODELS, Volume II - by Harold A. Underhill. Illustrated with plans, sketches, and photos. ix + 148 pp. Glasgow: Brown, Son and Ferguson, Ltd. 32 shillings.

Model makers who have Volume I of Mr. Underhill's treatise on plank and frame construction will probably find this concluding volume very useful in some ways and disappointing in others. The greater part of this book is devoted to masting and rigging the LEON, a brigantine built in Norway in 1880. Those who have already constructed the hull of the LEON, described in Volume I, will find here the necessary descriptions of the spars and the rigging for completing their models, but others who are seeking additional information on built-up construction may not be as satisfied.

A brief examination of each of the six chapters may be helpful to the would-be purchaser:

I - Masting the Brigantine:- In some ways this is the most important part of the book, although this reviewer does not agree with the author's suggestion that boxwood be used for spars. Considerable space is devoted to masthead construction, and justly so, since modelers are often indifferent to its appearance. Mr. Underhill provides some good, and frequently clever, instructions for making "iron work". Nothing is said, however, concerning making eye-bands by crimping and soldering thin sheet brass, a simple and effective method for small scales.

II - Standing Rigging:- While mostly a description of how the standing rigging was rove on the LEON, this chapter does contain some good tips and useful general information. I must say that the author's method of setting up shrouds has not been found satisfactory by me in actual practice. He recommends cutting off the excess shroud line after turning in the deadeye and putting on a throat seizing and an end seizing. My personal experience has shown that the shrouds have to be adjusted as the rigging proceeds and this cut-off part might be needed. If the modeler tries to make the adjustment by re-reeving the lanyards he will end up with the deadeyes at various heights above the rail.

III - Running Rigging:- This chapter, like the preceding one, is principally a description of the rigging. The author fails to give instructions anywhere for making metal-strapped blocks, although he indicates them in many of his sketches.

IV - Clinker-Built Models:- This section dealing with the construction of small open boats is the most informative part of the book. The author says he has only limited experience with these, but he, nevertheless, provides precise instructions that should be understandable to nearly any careful craftsman. Numerous plans exist of small clinker-built craft, but model builders have neglected them. By following

the methods outlined by Mr. Underhill, an interesting group of small boats can be added to one's collection.

V - Sailing Models:- Mr. Underhill explains how sailing models of square-riggers can be built to scale. He believes that a good model can be produced without making the hull oversize. Concise directions are provided for building hulls with planking on light bent frames, a type of construction often used for racing yachts.

VI - Sawn-Frame Construction:- Plywood is a controversial material for model building. Some men are enthusiastic users of it, while others won't touch it. In this short chapter, the author furnishes directions for constructing large working models by making frames of plywood, a boon to those who do not want to bother with futtocks, and then assembling the model upside down on a building board; this system insures accuracy and should be used more widely.

Providing plans large enough to be usable is always a problem in a book of this kind. This one includes five plates which are small reproductions of some of Mr. Underhill's well-known plans. One, the spar details of the LEON, has been reduced so drastically that parts of it cannot be read even with the aid of a magnifying glass. Mr. Underhill has also made many sketches to illustrate the text. They are far superior to those found in most ship model books; in fact, I think they are surpassed only by those in Longridge's book on the VICTORY.

-Ernest M. Pittaro

A HISTORY OF POLAR EXPLORATION - by L. P. Kirwan. Illustrations and maps. x + 374 pp. New York: W. W. Norton & Co., Inc. $5.95.

Since the sixteenth century there has been a fairly steady stream of Europeans and Americans venturing into the Arctic and Antarctic Polar regions. They went for a variety of reasons. The earliest were mainly concerned to find a water route through or around the land masses that separated the Atlantic Ocean from the Orient. Others were seeking wealth in the form of minerals, whales, seals, furs. Later, scientific study - of the earth's magnetism, geology, plant and animal life, climate - was an important motive. In the great period of polar explorations, the later nineteenth and early twentieth centuries, the desire for personal or national glory drove men to strive for the farthest north or farthest south, sometimes to the neglect of more practical considerations.

They traveled by many different means, but until the development of dependable aircraft, ships were a necessary part of every polar expedition. Oddly enough, it is only in comparatively recent years that vessels like Nansen's FRAM and Peary's ROOSEVELT have been especially designed and built for polar navigation. In previous years, all sorts of naval ships, merchantmen, whalers, and even yachts were used. Many of these were so ill suited for the work they did, that it is amazing that they were as successful as they were.

This book, written by the Director of the Royal Geographic Society, traces the history of man's advance into the polar regions from the earliest days to the present. The periods prior to the sixteenth century are covered in one short chapter. It would be fascinating to know more about this, but the records are so scanty and uncertain that our whole knowledge of it can be adequately recorded in a few pages. The events of the last forty years are treated very briefly "because of the difficulty of achieving historical perspective at such close range..." Here the difficulty is not too little, but too much information.

For the intervening years from 1500 to 1920 the story is told well and in consider-

able detail. Virtually every significant exploration and discovery is included. In treating controversial subjects, the author is generally fair and unbaised. Some readers may resent his depreciation of the accomplishments of American sealers and whalers in the Antarctic, but he gives convincing evidence to support his views.

The book is much more than a series of accounts of expeditions, although the more inportant ones are fully described. It is primarily a history of the motives and the economic, scientific, and other results of these expeditions. It gives an excellent over-all picture of the progress made from the early days, when man's idea of the polar regions was based on myths and guesses, to the present, when almost all the area has at least been observed, and new knowledge is being rapidly accumulated.

There are several maps, but they are somewhat inadequate. The end papers have maps of the north and south polar regions, but the awkward location, the small scale, and the paucity of place names reduce their usefulness. There is a map showing the routes of some of the expeditions seeking a northwest passage, but it is drawn in such a way as to make it hard to distinguish land from water and coastlines from routes. It is suggested that anyone reading this book have at hand large-scale maps of the polar regions.

The book has an index and a good bibliography listing about 160 items.

-F. W. Thober

SVERDRUP'S ARTIC ADVENTURES: Adapted from "New Land: Four Years in the Arctic Regions", by Otto Sverdrup; with additional chapters by T. C. Fairley. Illustrated with photographs and maps. xii + 305 pp. London and New York: Longmans, Green & Co. $6.00.

Fridtjof Nansen's attempt to drift across the North Pole in the FRAM is one of the best-known Arctic expeditions. Much less publicized, but in many ways more productive was the ship's second Arctic trip. This was led by Otto Sverdrup, a Norwegian shipmaster who had been second in command to Nansen and had brought the FRAM safely to port after Nansen left on his unsuccessful try for the Pole. In four unbroken years in the Arctic, thousands of square miles to the west of Greenland were explored and mapped for the first time. The voyage was so well planned and the techniques of Arctic living so well developed that the members of the expedition suffered no serious hardships.

Sverdrup wrote an account of the expedition, an English translation of which was published in 1904, with the title "New Land". Mr. Fairley has condensed Sverdrup's 946 pages into 250. This has been done by omitting large portions of the original book. These include most of the descriptive matter, many of the details of the numerous long trips made by dog sledge when the ship was frozen in the ice, and information on their equipment and methods. The text of the condensed version is mostly taken verbatim from the English translation of "New Land", but there are occasional changes in wording which generally do not seem to be improvements. The short version covers all the principal events, but rather hurriedly; the original is much better reading and contains far more information.

"New Land" has over 200 illustrations, mostly photographs, which add a great deal of interest to the book. Only one of these has been reproduced in the new book. In addition, there are several aerial photographs of the regions explored and some pictures of Sverdrup and of the FRAM. There are eight maps which are of some help in following the progress of the expedition, but they are inferior to the maps in "New Land". The latter include two large scale folding maps with very complete place names.

To the material written by Sverdrup, Mr. Fairley has added two new chapters on

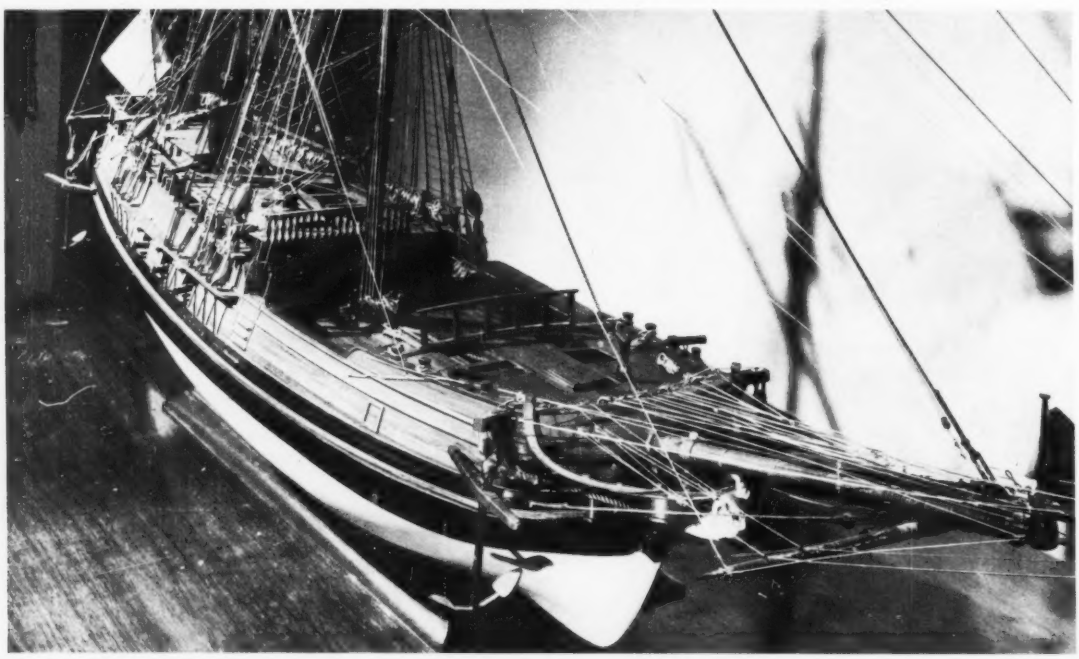
the explorer's earlier and later life and on the controversy between Norway and Canada over the ownership of the lands discovered. The twenty pages devoted to the latter would have been better used if filled with more of Sverdrup's writings.

Mr. Fairley has done a useful service in making available an account of an important voyage of exploration. "New Land" has long been out of print and is difficult to obtain. The New York Public Library has copies in Norwegian and German, but not in English. The American Geographical Society in New York has a copy of the English translation. It is recommended to anyone who has the time to read almost a thousand pages. Those who do not can get a briefer, but generally satisfactory account of the expedition from Mr. Fairley's book.

-F. W. Thober

SURVEYOR OF THE SEA: The Life and Voyages of Captain George Vancouver - by Bern Anderson. Illustrations and Maps. xii + 274 pp. Seattle: University of Washington Press. $6.75.

Vancouver was one of those men who served under Cook and afterwards went on to gain a lesser fame in their own right. He died in obscurity and his accomplishments have been beclouded by charges that he was a hot-headed, brutal commander. Vancouver was one of the "young gentlemen" in the RESOLUTION during Cook's second and third voyages. Little is known of him immediately after this other than that he served on several routine cruises in the Caribbean. However, he did attract the attention of the Commodore, Sir Alan Gardner, and apparently Gardner's influence led to his selection as second in command of an expedition to uphold British claims in the fur trade at Nootka Sound, Alaska. When the original commander resigned the post, Vancouver was put in charge. The expedition, composed of the ship DISCOVERY and the brig CHATHAM, after long delays got under way from Falmouth on April 1, 1791, to "begin what was to prove one of the longest continuous voyages in history."



ANOTHER VIEW OF THE BOMB KETCH *MERCURE* SHOWN ON THE COVER, AND REPRODUCED BY COURTESY OF THE OWNERS, BERN C. RITCHIE AND CO. AFTER SEEING THIS GRAPHIC EVIDENCE, IT IS EASY TO UNDERSTAND WHY THIS TYPE OF VESSEL WAS DUBBED "A SHIP WITHOUT A FOREMAST."

After touching at the Cape, Australia, New Zealand, and several of the principal Pacific islands, the two ships sighted the California coast a year later, April 18, 1792. Not only was Vancouver to protect British interests at Nootka Sound, but he was to chart the North American coast between 60° and 30° north latitude as well, and to determine whether the fabled Northwest Passage really existed. His position was not an enviable one. Charged with enormous responsibilities, he had to maintain discipline and morale among men cooped up in small vessels while a life of ease beckoned ashore. The crew's health had to be carefully guarded, for scurvy was still a hazard on lengthy voyages. The tortuous shoreline necessitated doing much of the survey from the ships' boats. This was exhausting work, with the men frequently away from the ships for days, but Vancouver never relaxed his exacting standards.

Ice and fog prevented year-round operations so the expedition wintered at the Hawaiian Islands. This time was not spent idly of course. The entire island chain was surveyed. Vancouver's prestige with the natives grew to such stature that in 1794 they formally "ceded the said island of Owhyhee to His Britannic Majesty and acknowledged themselves subjects of Great Britain." However, as the author points out, "the experience of the American Revolution led many in England to believe that colonies were certain to break away from the mother country...(and) the fact that the British Government did not choose to accept them in no way detracts from Vancouver's accomplishments."

At last, in August, 1794, the great survey of the Northwest coast - from Cook's Inlet in Alaska all the way down to the peninsular of Lower California - was completed, and the expedition could sail for home. Back in England again, more than a year later, Vancouver found little honor and less pleasure. A sick man with only three more years to live, he was put on half pay, and commenced preparing his journals for publication. He had sent three midshipmen home from the Pacific for disciplinary reasons. Out of this grew the scandalous "Camelford affair", which was to blight Vancouver's last years. Camelford, a well-connected nobleman, now accused Vancouver of having had him flogged. "This incident, and the resulting inquiry into Vancouver's conduct, further weakened his health and ended his career in the navy."

Illustrated with reproductions of the original plates from the official account of the voyage, together with five good maps, "Surveyor of the Sea" is a carefully-documented tribute to a man who has been overshadowed by the great Cook. Admiral Anderson has written a consistently interesting study of this controversial man, and one that should be especially welcome to those who do not have access to the expensive three volume history. Regardless of the merits or defects of Vancouver's character, his work in charting the Pacific Northwest coast remains a testimony to British seamanship.

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